

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
21 August 2003 (21.08.2003)

PCT

(10) International Publication Number  
**WO 03/069457 A1**

(51) International Patent Classification<sup>7</sup>: **G06F 3/00**

(21) International Application Number: **PCT/US03/04039**

(22) International Filing Date: **11 February 2003 (11.02.2003)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:  
10/076,658 14 February 2002 (14.02.2002) **US**

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(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

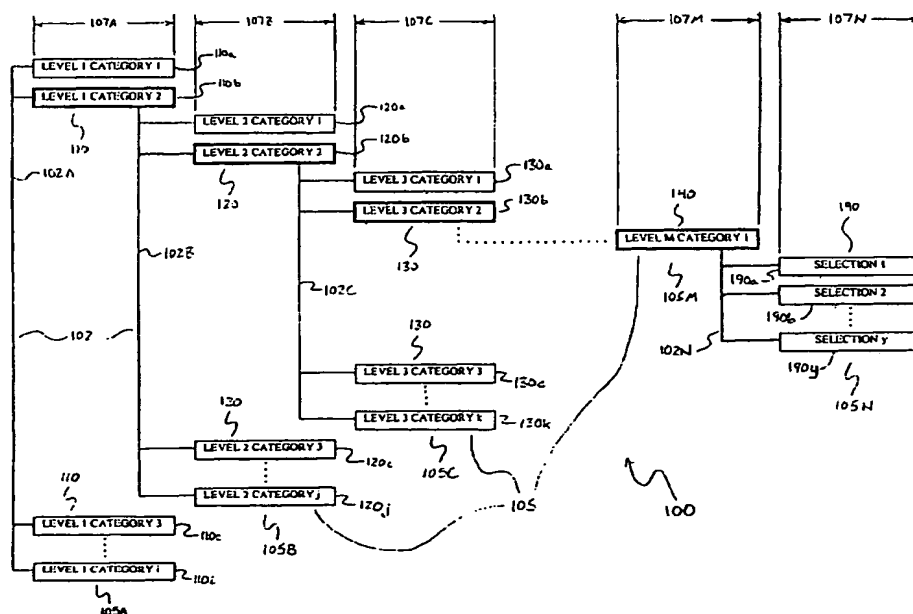
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**Published:**  
— with international search report

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **HIERARCHICAL TREE STRUCTURE PROGRAM GUIDE**



(57) Abstract: A television program guide (100) exhibiting a hierarchical tree structure. The hierarchical tree structure includes a first level (105A) having a plurality of categories and one or more lower levels, each of the lower levels having one or more categories and/or content selections.

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## HIERARCHICAL TREE STRUCTURE PROGRAM GUIDE

This application claims the benefit of provisional application no. 60/350,317, filed January 17, 2002 entitled HIERARCHICAL TREE STRUCTURE PROGRAM GUIDE.

### FIELD OF THE INVENTION

[0001] The invention relates generally to electronic program guides for displaying television programming information to viewers and, more particularly, to a program guide exhibiting a hierarchical tree structure.

### BACKGROUND OF THE INVENTION

[0002] It is now commonplace for cable and satellite television providers to offer dozens – and, in some instances, hundreds – of channels, many of which offer twenty-four hour programming. The quantity of available content may simply overwhelm many viewers, making it difficult for a viewer to select a program for viewing or to locate a specific program. Thus, many television viewers utilize on-screen, electronic program guides to find and select television programs for viewing and/or recording. These electronic program guides may be provided by the viewer's cable or satellite television provider or provided by a third party.

[0003] On-screen, electronic program guides are well-known in the art. Generally, such an electronic program guide provides a television viewer with a catalog of television programs, or content, together with the broadcast time and channel for each television program. In addition, conventional program guides may provide a more detailed summary of a television program, including such information as actors, director, program length, rating information, parental control information (e.g., commonly accepted indicators – such as GV, V, N, BN – that identify specific content), year of release, and program classification (e.g., drama, action/adventure, western, sitcom), as well as an indication whether a program is a rerun.

[0004] One common type of electronic program guide provides a two dimensional grid structure that presents the viewer with available television programming as a function of time (which is listed along one axis) and channel (which is listed along a second, perpendicular axis). A television program airing on a channel at a specified time is positioned within the grid at the juncture corresponding to that channel and specified time. Typically, the programming content for all television channels received by a viewer is simultaneously displayed in the two dimensional grid structure

and, in many instances, the viewer must scroll through a large portion of the grid structure when searching for a program. Thus, although relatively simple, such a two dimensional grid structure can be difficult and inefficient to navigate if there is a large number of channels.

[0005] More recent electronic program guides offer increased functionality – e.g., interactivity, customizable menus, search capabilities – aimed at improving efficiency and ease of use. However, this increased functionality itself may result in a complex and difficult to use program guide, often requiring the viewer to input multiple commands and/or keystrokes using a multi-button remote control device or a keyboard. For example, executing a search function, although useful for locating a specific program, may require entry of multiple words and/or letters.

[0006] Cable and satellite television providers have, in recent years, steadily increased the quantity of programming content being offered to customers, a trend that is expected to continue. As cable and satellite television providers continue to offer more and more television programming, in conjunction with the increasing complexity of currently available electronic program guides, as noted above, conventional electronic program guides are becoming increasingly difficult to use and provide inefficient navigation.

#### SUMMARY OF THE INVENTION

[0007] A television program guide viewable on a display device. The program guide comprises a plurality of levels, including at least a first level displayed on the display device and a second level. The first level includes a plurality of first level categories interconnected by a branch. The second level includes a plurality of second level categories, and a portion of the plurality of second level categories is associated with each of the first level categories. Each portion of second level categories is displayable on the display device in response to selection of its associated first level category. When a portion of second level categories is displayed, each second level category of that portion is coupled with its associated first level category by a branch. The program guide further comprises at least one content selection associated with a category of one of the plurality of levels. The at least one content selection is displayable on the display device in response to selection

of its associated category and, when displayed, the at least one content selection is coupled with its associated category by a branch.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 shows one exemplary embodiment of a hierarchical tree structure program guide.

[0009] FIG. 2 shows a second exemplary embodiment of a hierarchical tree structure program guide.

[0010] FIG. 3A shows a third exemplary embodiment of a hierarchical tree structure program guide.

[0011] FIG. 3B shows an alternative embodiment of the hierarchical tree structure program guide of FIG. 3A.

[0012] FIG. 4 shows a fourth exemplary embodiment of a hierarchical tree structure program guide.

[0013] FIG. 5 shows a fifth exemplary embodiment of a hierarchical tree structure program guide.

[0014] FIG. 6 shows a sixth exemplary embodiment of a hierarchical tree structure program guide.

[0015] FIG. 7 shows a seventh exemplary embodiment of a hierarchical tree structure program guide.

[0016] FIG. 8A is a schematic diagram illustrating an exemplary embodiment of a system for implementing a hierarchical tree structure program guide.

[0017] FIG. 8B shows an exemplary embodiment of a remote input device that may be used to navigate a hierarchical tree structure program guide.

[0018] FIGS. 9A-F illustrate an exemplary embodiment of a method of navigating a hierarchical tree structure program guide.

## DETAILED DESCRIPTION OF THE INVENTION

[0019] One embodiment of a hierarchical tree structure program guide 100 is illustrated in FIG. 1, as the program guide 100 may appear to a viewer on a television screen. The hierarchical tree structure program guide 100 provides the viewer with an intuitive, easy-to-use program guide that may be navigated using a minimum number of command entries, thereby providing the viewer with an efficient navigation tool. The hierarchical tree structure program guide 100 may be implemented in any suitable apparatus – including a television or a “set-top box” – and an exemplary embodiment of such an apparatus is illustrated and described below.

[0020] The hierarchical tree structure program guide 100 includes a plurality of levels 105, including levels 105A, 105B, 105C, . . . , 105N. As a viewer navigates the hierarchical tree structure provided by program guide 100, any suitable number of levels 105 may be displayed to the viewer. Further, the viewer may encounter a number of levels 105 while navigating one path through the program guide 100, while the viewer may encounter a different number of levels 105 while navigating a second path in the program guide 100. Stated another way, how “deep” a viewer navigates into the hierarchical tree structure of program guide 100 is a function of the specific choices made by the viewer, and the viewer may encounter any suitable number of levels 105 as is necessary to satisfy the viewer’s commands and/or queries.

[0021] Each level 105 includes a plurality of categories arranged in a substantially vertical column. For example, the first level 105A (LEVEL 1) includes a plurality of categories 110 arranged in a substantially vertical column 107A. Similarly, the second level 105B (LEVEL 2) includes a plurality of categories 120 arranged in a substantially vertical column 107B, while the third level 105C (LEVEL 3) includes a plurality of categories 130 arranged in a substantially vertical column 107C. Any suitable number of categories 110, 120, 130, 140 – or any suitable number of content selections or combination of categories and content selections, as will be explained in greater detail below – may be provided within each of the levels 105A-N, respectively. Visually, each category may be represented by any suitable image or shape – e.g., a rectangle, a square, a circle, an oval (or ellipse), a triangle, or a

parallelogram – that is presented using a solid, dashed, hidden, dotted, or double line, or any other suitable lines and/or symbols.

[0022] During use, although all categories 110 – including categories 110a, 110b, 110c, . . . , 110i – of the first level 105A (i.e., the “first level categories”) may be displayed, only selected categories 120, 130, 140 of the lower levels 105B (LEVEL 2), 105C (LEVEL 3), . . . , 105N (LEVEL N), respectively, are displayed to the viewer. By way of example, as shown in FIG. 1, the second category 110b of the first level 105A (i.e., the “first level second category”) is selected, as denoted by the highlighted box, and all categories 120a, 120b, 120c, . . . , 120j in the second level 105B associated with the first level second category 110b are displayed. It should be understood, however, that each category 110 of the first level 105A may have one or more second level categories (and/or content selections) associated therewith.

[0023] Within the plurality of displayed second level categories 120a-j, the second category 120b is selected, as denoted by the highlighted box. Accordingly, all categories 130a, 130b, 130c, . . . , 130k in the third level 105C associated with the second level second category 120b are displayed. Again, it should be understood that each second level category 120 may have one or more third level categories associated therewith.

[0024] As a viewer navigates through the hierarchical tree structure program guide 100 and makes additional choices – e.g., selecting the second category 130b of the third level 105C, as denoted by the highlighted box – categories (and/or content selections) associated with subsequent, lower levels are displayed to the viewer. For example, the viewer may eventually navigate down to the M<sup>th</sup> level 105M, where a category 140, if selected, includes a plurality of content selections 190, including content selections 190a, 190b, . . . , 190y, at the N<sup>th</sup> level 105N, the content selections 190a-y being arranged in a substantially vertical column 107N. Each content selection 190 may identify a specific television program or programming event or, alternatively, a content selection 190 may correspond to a television channel. Visually, each content selection 190 may be represented by any suitable image or shape – e.g., a rectangle, a square, a circle, an oval (or ellipse), a triangle, or a parallelogram – that is presented using a solid, dashed, hidden, dotted, or double line, or any other suitable lines and/or symbols.

[0025] As a visual aid to a viewer navigating the hierarchical tree structure provided by program guide 100, a branch 102 may couple a category (or content selection) with the upper level category with which it is associated. A branch 102 may also interconnect all of the categories and/or content selections at a level being displayed to the viewer. As used herein, a “branch” refers to any viewable element indicating an association between a content selection and an upper level category, between a category and another upper level category, between two or more content selections at the same level, and/or between two or more categories at the same level. Further, as used herein, a “branch” may refer to an element coupling an individual category (or content selection) with its associated upper level category, or a “branch” may refer to an element coupling a plurality of categories and/or content selections with their associated upper level category, as well as interconnecting the plurality of categories and/or content selections. Visually, a branch 102 may comprise any suitable line (e.g., solid, dashed, hidden, dotted, double) or group of symbols (e.g., a series of asterisks, stars, arrows), or any suitable combination thereof.

[0026] For example, a branch 102A interconnects the categories 110a-i of the first level 110A (note that there is no upper level category with which to associate each of the first level categories). Another branch 102B couples the second level categories being displayed to the viewer (i.e., categories 120a-j) with the upper level category (i.e., first level second category 110b) that the displayed second level categories 120a-j are associated with, and the branch 102B also interconnects the second level categories 120a-j. Similarly, a branch 102C couples the displayed third level categories 130a-k with the upper level category (i.e., second level second category 120b) with which the displayed third level categories 130a-k are associated, and the branch 102C also interconnects the third level categories 130a-k. It should be understood that, if different categories are selected at each level, a branch 102 will be displayed coupling each of these categories with their associated upper level category. A branch 102N also couples each of the content selections 190a-y with the upper level category (i.e., M<sup>th</sup> level category 140) that the content selections 190a-y are associated with and, further, the branch 102N interconnects the content selections 190a-y.

[0027] Another embodiment of a hierarchical tree structure program guide 200 is shown in FIG. 2, as the program guide 200 may appear to a viewer on a television

screen. The program guide 200 includes a plurality of categories 210a-e associated with a first level 205A, the first level categories 210a-e being displayed in a substantially vertical column 207A and interconnected by branch 202A. Associated with each first level category 210a-e is a plurality of second level categories. For example, a plurality of second level categories 220a-c are associated with the first level third category 210c, the first level third category 210c having been selected as denoted by the highlighted box. The plurality of displayed second level categories 220a-c are each coupled with the first level third category 210c by a branch 202B, the branch 202B also interconnecting the second level categories 220a-c. The displayed second level categories 220a-c are arranged in a substantially vertical column 207B; however, the vertical column 207B overlaps with the vertical column 207A of the first level 205A. Such overlapping vertical columns 207A, 207B (as well as overlapping columns 207C, 207D, and 207E) may be used to alter the viewable width of the hierarchical tree structure program guide 200 to adapt the program guide 200 to various sizes of television screens or to otherwise adjust the overall viewable width of the program guide 200.

[0028] The hierarchical tree structure program guide 200 also includes one or more third level categories associated with each of the second level categories 220a-c. For example, associated with the second category 220b of the second level 205B, which is selected as denoted by the highlighted box, are categories 230a-c of the third level 205C. The displayed third level categories 230a-c are each coupled with the second level second category 220b by a branch 202C, the branch 202C also interconnecting the third level categories 230a-c. The displayed third level categories 230a-c are arranged in a substantially vertical column 207C that overlaps with the vertical column 207B associated with the second level 205B. Similarly, one or more fourth level categories are associated with each of the third level categories 230a-c. In the illustrated example, a plurality of categories 240a-c are associated with the third level first category 230a, which is selected as denoted by the highlighted box. Each of the fourth level categories 240a-c is coupled with the third level first category 230a by a branch 202D, and the displayed fourth level categories 240a-c are arranged in a substantially vertical column 207D overlapping with column 207C.



[0029] In FIG. 2, one of the displayed fourth level categories – i.e., the second category 240b – has been selected (see highlighted box), exposing content selections 290a, 290b at a fifth level 205E and arranged in a substantially vertical column 207E overlapping with column 207D. The second content selection 290b has been selected for viewing or recording, as denoted by the highlighted box. In an alternative embodiment of a hierarchical tree structure program guide, content selections may be associated with “upper” level categories in combination with categories. For example, as illustrated in FIG. 2, the program guide 200 includes content selections 290e, 290f at the third level 205C that are associated with the displayed second level second category 220b. Note that the second level second category 220b also has a plurality of third level categories 230a-c associated therewith.

[0030] In yet another embodiment of the invention, only a portion of a hierarchical tree structure program guide may be displayed to a viewer. As a viewer makes selections and progresses “downward” to “lower” levels within the hierarchical tree structure, the viewer may zoom in on the displayed program guide, such that a portion of the hierarchical tree structure in a region surrounding the most recent selection is enlarged and displayed. For example, referring to FIG. 2, as a viewer inputs selections (e.g., selecting the third level first category 230a) and navigates to “lower” levels within the hierarchical tree structure of program guide 200, only the portion of the program guide 200 falling within the boundary 50 (denoted by dashed line) may be displayed to the viewer. When it is necessary for a viewer to navigate multiple levels within the hierarchical tree structure, it may be desirable to provide such a zoom-in function in order to maintain the text and/or feature size of the program guide 200 (or 100) at a size sufficient for viewing. Also, a corresponding zoom-out function may be provided to assist a viewer navigating “upwards” through the hierarchical tree structure of program guide 200 (or 100). These zoom-in and zoom-out functions may be performed manually by the user or, alternatively, performed automatically.

[0031] As illustrated in FIGS. 1 and 2, when a category is selected to expose the next lower level categories associated with the selected category, the lower level categories are displayed in a nested fashion. For example, referring to FIG. 1, the second level categories 120a-j associated with the first level second category 110b are

displayed such that the second level categories 120a-j are disposed, or nested, underneath their associated first level category (i.e., 110b) and, if a lower first level category exists, between the associated first level category and the next lower first level category (i.e., 110c). The first level 105A may be vertically expanded to accommodate this nesting of the lower level categories (120a-j). Similarly, with reference to FIG. 2, the second level categories 220a-c associated with the first level third category 210c are displayed to the viewer such that the second level categories 220a-c are nested underneath their associated first level category (i.e., 210c) and, if a lower first level category exists, between the associated first level category and the next lower first level category (i.e., 210d). Also, as noted above, the displayed second level categories 220a-c are arranged in a column 207B that overlaps the column 207A, in which the first level categories 210a-e are arranged.

[0032] A combination of overlapping columns and nested levels – or any other suitable spatial relationship or combination of spatial relationships – may itself be utilized to indicate associations between levels. Associations between a category and an upper level category, between a content selection and an upper level category, between two or more categories at the same level, and between two or more content selections at the same level would be denoted simply by the spatial relationships (e.g., overlapping columns and/or nested levels) existing between the displayed levels, and branches may not be necessary. An embodiment of a hierarchical tree structure program guide utilizing such spatial relationships to denote category and/or content selection associations would essentially appear as, for example, the embodiment of a program guide 200 illustrated in FIG. 2; however, the branches 202A, 202B, 202C, 202D, 202E would not be included.

[0033] According to an alternative embodiment, however, displayed lower level categories are not nested within the upper level categories. An example of a hierarchical tree structure program guide 300 that does not utilize such nesting is shown in FIG. 3. The program guide 300 includes a plurality of categories 310a-d at a first level 305A that are interconnected by a branch 302A. The first level second category 310b is selected to expose a plurality of categories 320a-d at a second level 305B. The displayed second level categories 320a-d are each coupled with the first level second category 310b by a branch 302B that also interconnects the second level

categories 320a-d. However, the first level 305A has not been vertically expanded to nest the displayed second level categories 320a-d between their associated first level category (i.e., 310b) and the next lower first level category (i.e., 310c). Similarly, the second level 305B is not expanded to allow nesting of a plurality of displayed third level (305C) categories 330a-c, and the third level 305C is not expanded to allow nesting of a plurality of content selections 390a-e at a fourth level 305D.

[0034] As noted above, the term “branch” may refer to an element coupling a plurality of categories and/or content selection with their associated upper level category, or a “branch” may refer to an element coupling a single category or content selection with its associated upper level category, the latter of which is illustrated in FIG. 3B. Referring to FIG. 3B, a branch 302B' couples the second level first category 320a with the first level second category 310b. Similarly, branches 302B'', 302B''', and 302B'''' couple the second level second category 320b, the second level third category 320c, and the second level fourth category 320d, respectively, with the first level second category 310b.

[0035] The hierarchical tree structure program guides 100, 200 exhibit categories arranged in substantially vertical columns (e.g., columns 107A-N of program guide 100 and columns 207A-E of program guide 200). However, a hierarchical tree structure program guide may be oriented – as the program guide appears to a viewer – in any suitable manner. For example, in a further embodiment of a hierarchical tree structure program guide 400 shown in FIG. 4, the levels are arranged in substantially horizontal columns. The program guide 400 includes a plurality of first level (405A) categories 410a-c arranged in a substantially horizontal column 407A, the first level categories interconnected by a branch 402A. The first level third category 410c is selected to expose a plurality of second level (405B) categories 420a-c arranged in a substantially horizontal column 407B, the second level categories 420a-c being coupled with the first level third category 410c by a branch 402B. Similarly, the second level third category 420c is selected to expose a plurality of third level (405C) categories 430a-d arranged in a substantially horizontal column 407C, and the third level second category 430b is selected to display a plurality of content selections 490a-c that lie at a fourth level 405D and that are arranged in a substantially horizontal column 407D.

[0036] Additional exemplary embodiments of a hierarchical tree structure program guide are illustrated in FIGS. 5 through 7, as each of these embodiments may appear to a viewer on a television screen. Referring to FIG. 5, a hierarchical tree structure program guide 500 includes a first level 505A having a plurality of categories 510a-d interconnected by a branch 502A. The first level first category 510a represents an alphabetical group in the range of "A-F" while the first level second category 510b represents an alphabetical group in the range "G-L." Similarly, the alphabetical groups "M-R" and "S-Z" are included in the first level third category 510c and the first level fourth category 510d, respectively.

[0037] Each of the first level categories 510a-d includes one or more categories (or one or more content selections or a combination of categories and content selections) at a second level. For example, as shown in FIG. 5, the first level second category 510b includes a plurality of second level categories 520a-f, which are coupled with the first level second category 510b by a branch 502B. Each of the displayed second level categories 520a-f corresponds to an alphabetical category, including the alphabetical categories "G", "H", "I", "J", "K", and "L", respectively.

[0038] Associated with each of the second level categories 520a-f are a plurality of selections (or, optionally, additional categories or a combination of selections and categories) that lie at a third level 505C. For example, a plurality of selections 590a, 590b, . . . , 590q are associated with the second level second category 520b, each of the selections 590a-q corresponding to a television channel (e.g., CHANNEL 1, CHANNEL 2, . . . , CHANNEL q). The embodiment of a hierarchical tree structure program guide 500 illustrated in FIG. 5 may be useful when a viewer is simply attempting to select a television channel for viewing (i.e., when using the program guide 500 as a channel tuner). In this instance, the selections 590a-q do not correspond to specific television programs or events but, rather, represent television channels being received from a cable or satellite provider and/or other broadcasters. For example, each of the selections 590a-q may correspond to a channel beginning with the letter "H", such as HBO®, HGTV®, and The History Channel®. Upon choosing one of the selections 590a-q, the viewer's tuner tunes to the corresponding channel.

[0039] Referring to FIG. 6, a hierarchical tree structure program guide 600 includes a first level 605A having a plurality of categories 610a-c interconnected by a branch 602A. Each of the first level categories 610a-c corresponds to a time window, such as a day (i.e., twenty-four hours). For example, the first level first category 610a may correspond to the present day on which the program guide 600 is being accessed (CURRENT DAY), whereas the first level second category 610b and the first level third category 610c may correspond to the following day (DAY 1) and the next subsequent day (DAY 2), respectively. The first level categories 610a-c may each correspond to any other suitable length time window.

[0040] The first level categories 610a-c each include one or more second level categories (or one or more content selections or a combination of categories and content selections). For example, the first level first category 610a (CURRENT DAY) includes a plurality of second level categories 620a-f, which are coupled with the first level first category 610a by a branch 602B. Each of the displayed second level categories 620a-f corresponds to a narrower (as compared to the first level categories 610a-c) time window. In the illustrated embodiment, the second level first category 620a corresponds to a time window of "12AM – 4AM", the second level second category 620b corresponds to a time window of "4AM – 8AM", and so on. It should be understood, however, that the time windows represented by each of the second level categories 620a-f may be of any other suitable length (e.g., two hours).

[0041] Associated with each of the second level categories 620a-f are one or more third level categories (and/or content selections). As shown in FIG. 6, by way of example, the second level fourth category 620d (12PM – 4PM) includes a plurality of categories 630a-d associated with the third level 605C. Each of the displayed third level categories 630a-d corresponds to type, classification, or group of programming event. The third level first category 630a corresponds to "MOVIES", the third level second category 630b corresponds to "TELEVISION SERIES", the third level third category 630c corresponds to "SPORTS", and the third level fourth category 630d corresponds to "NEWS." A third level category may correspond to any other suitable type, classification, or group of television program (e.g., CHILDREN'S TV, HOME SHOPPING, PUBLIC ACCESS, and the like). Throughout the figures, the illustrated categories at any given level are not logically arranged according to title; however, it

should be understood that categories at a given level may be arranged alphabetically by category title (or presented in any other suitable logical arrangement).

[0042] The third level categories 630a-d may each have one or more fourth level categories associated therewith. For example, as illustrated in FIG. 6, the third level third category 630c may include a plurality of fourth level categories 640a-d corresponding to "BASEBALL" (640a), "BASKETBALL" (640b), "GOLF" (640c), and "SOCCER" (640d), or any other suitable sub-classification, sub-type, or sub-group. Each of the fourth level categories 640a-d may include one or more selections (or, optionally, additional categories or a combination of selections and additional categories). By way of example, the fourth level second category 640b (BASKETBALL) includes three content selections 690a-c, each of the content selections corresponding to a specific television program or event (e.g., a men's or women's basketball game).

[0043] The hierarchical tree structure program guide 600 illustrated and described with respect to FIG. 6 may be used by a viewer to select – from all presently available television programming – a specific program for instant viewing. Thus, a viewer with no knowledge of currently available programming may perform "tree surfing" to quickly locate a program the viewer finds interesting. When a viewer selects (by inputting the appropriate command, as will be explained in greater detail below) one of the content selections 690a-c, the viewer's tuner may automatically tune to the channel on which the corresponding television program is playing or will be played. Alternatively, when a viewer selects one of the content selections 690a-c, the content selection may be tagged for recording, as will be explained in greater detail below. A viewer can also use the hierarchical tree structure program guide 600 to search forward in time (to DAY 1 or DAY 2) for television programs the viewer may wish to watch and/or record.

[0044] The box corresponding to each content selection 690a-c may, in addition to listing the program, identify the channel and broadcast time. In other embodiments, further programming information is associated with each content selections 690a-c. For example, by inputting the appropriate command (e.g., pushing a button), additional "pop-up" categories or menus may appear to the viewer. In the following discussion, an exemplary embodiment of a hierarchical tree structure

program guide including pop-up categories associated with a content selection (see FIG. 6) and another exemplary embodiment of a hierarchical tree structure program guide including a pop-up menu associated with a content selection (see FIG. 7) are presented; however, it should be understood that pop-up categories and/or a pop-up menu may be associated with a category as well.

[0045] Referring to FIG. 6, by choosing the second content selection 690b and inputting the appropriate command, a subsidiary level 605' of categories 650a-c coupled with the second content selection 690b by a branch 602' may be displayed, each subsidiary level category 650a-c corresponding to a classification, type, or group of information relating to the chosen content selection 690b. For example, the subsidiary level first category 650a provides information on team statistics (TEAM STATS), the subsidiary level second category 650b provides information on team schedules (TEAM SCHEDULES), and the subsidiary level third category 650c provides information on team rosters and/or player profiles (TEAM ROSTERS). Content selections and/or further, lower level categories are then associated with each of the subsidiary level categories 650a-c. For example, the subsidiary level third category 650c includes a first content selection 690g (TEAM A) and a second content selection 690h (TEAM B).

[0046] Referring now to FIG. 7, a hierarchical tree structure program guide 700 includes a first level 705A comprised of a plurality of categories 710a-d interconnected by a branch 702A. The first level categories 710a-d each correspond to a classification, type, or group of television program or event, such as, for example, "TELEVISION SERIES" (710a), "NEWS" (710b), "MOVIES" (710c), and "SPORTS" (710d). Each of the first level categories 710a-d includes one or more categories (or content selections or a combination thereof) at a second level 705B, such as the second level categories 720a-d associated with the first level third category 710c. The displayed second level categories 720a-d each correspond to a sub-classification, sub-type, or sub-group of television program or event, including "SCI-FI" (720a), "WESTERN" (720b), "ACTION ADVENTURE" (720c), and "COMEDY" (720d), or other suitable sub-classifications. Once again, although the figures do not depict the categories at any given level as being arranged logically

according to category title, the categories at a given level may be arranged in alphabetical order.

[0047] The sub-classifications represented by the second level categories 720a-c are further delimited into additional sub-classifications, sub-types, or sub-groups at a third level 705C, fourth level 705D, and fifth level 705E. Each of the second level categories 720a-d has a one or more third level categories (and/or content selections) associated therewith. By way of example, the second level second category 720b may have a plurality of third level categories 730a-c, including "TITLE" (730a), "ACTORS" (730b), and "DIRECTOR" (730c), or other suitable sub-classifications. Each of the third level categories 730a-c has one or more fourth level categories (and/or content selections) associated therewith, such as the fourth level categories 740a-d associated with the third level second category 730b. The displayed fourth level categories 740a-d correspond to alphabetical groups "A-F" (740a), "G-L" (740b), "M-R" (740c), and "S-Z" (740d), or other suitable sub-groups or sub-classifications. Similarly, each of the fourth level categories 740a-d includes one or more fifth level categories, such as fifth level categories 750a-c associated with the fourth level second category 740b, which categories correspond to "ACTOR 1" (750a), "ACTOR 2" (750b), and "ACTOR 3" (750c), or other suitable sub-classifications.

[0048] The fifth level categories 750a-c each include one or more content selections (or, optionally, additional categories or a combination of content selections and additional categories). By way of example, the fifth level third category 750c includes content selections 790a, 790b. Each of the content selections 790a, 790b corresponds to a specific television program or event. In the illustrated embodiment, for example, the content selection 790a will identify a movie that is classified as a western and, further, that includes the actor identified by the "ACTOR 3" sub-classification (fifth level third category 750c).

[0049] Selecting a content selection 790a, 790b may tune the viewer's tuner to the channel on which the program corresponding to the chosen content selection 790a, 790b is playing or will be played. Alternatively, selecting a content selection 790a, 790b may tag the program corresponding to the chosen content selection for recording, as will be explained in greater detail below. The hierarchical tree structure



program guide 700 illustrated and described with respect to FIG. 7 may be useful to a viewer attempting to search for a specific television program or type of program, irrespective of when the desired program will be aired. The program guide 700 may include all (or a selected portion) of the television programs falling within a specified sub-classification. Alternatively, only those content selections that will actually be played or broadcast within a specified time window (e.g., within the upcoming week) will be included in the program guide 700.

[0050] A content selection 790a, 790b will typically display the title of the corresponding program and, optionally, the channel and broadcast time. However, in a further embodiment, additional information associated with a content selection 790a, 790b is provided in a "pop-up" menu, as suggested above. For example, as shown in FIG. 7, a pop-up menu 790' is associated with the first content selection 790a and is coupled therewith by a branch 702'. The pop-up menu 790' provides more detailed information regarding the content selection 790a. By way of example, the pop-up menu 790' may identify the program title 791, rating 792, parental control identifiers 793, air date and time 794, a list of actors 795, the director 796, a classification or type 797, as well as the year of release 798. Alternatively, a pop-up menu may include pictures (e.g., a movie clip) as well as promotional information. Also, a pop-up menu may be associated with a content selection representing a channel (see FIG. 5, items 590a-q), such a pop-up menu providing a description of the selected channel and/or providing a list of upcoming television programs airing on the selected channel.

[0051] Embodiments of a hierarchical tree structure program guide 100-700 having been described, it is important to emphasize that each of the program guides 100-700 illustrated in FIGS. 1 through 7, respectively, represents only a single example of what may be displayed to a viewer accessing that program guide. The levels and categories displayed to a viewer will, in practice, depend upon the specific choices made by a viewer navigating the hierarchical tree structure provided by the program guide. Multiple paths exist within such a hierarchical tree structure program guide, and the specific levels, categories, and content selections encountered by a viewer is path dependent. Further, it should be understood that content selections may be provided at any level (including the first level) within the hierarchical tree

structure. Also, only content selections may lie at a given level within the hierarchical tree structure or, alternatively, content selections may lie at a given level in combination with categories.

[0052] An embodiment of a system 800 for implementing a hierarchical tree structure program guide – such as the program guides 100-700 shown and described in FIGS. 1 through 7, respectively – is illustrated in FIG. 8A. The system 800 may comprise part of a video recorder, such as a video cassette recorder (VCR) or a digital video recorder, comprise a portion of a digital or analog television, or comprise part of a stand-alone “set top box,” such a set top box normally being coupled with a television or video recorder. It should be understood, however, that the system 800 represents an exemplary system for implementing a hierarchical tree structure program guide and, further, that the embodiments of a hierarchical tree structure program guide described herein may be implemented in any other suitable system or device.

[0053] The system 800 includes a processing unit 810. Coupled with the processing unit 810 – via communication paths 812 and 814, respectively – are program memory 820 and database memory 830. A remote receiver 840 for receiving command signals from a remote input device 870 is coupled to the processing unit 810 by a communication path 816, the remote receiver 840 receiving signals from remote input device 870 via communication media 90. Also coupled to the processing unit 810 is a manual input unit 850, the manual input unit 850 being coupled to processing unit 810 by communication path 818. The system 800 may be coupled with a display device 5, such as an analog or digital television (or form a part of such a television, as noted above). The communication paths 812, 814, 816, 818 may each comprise a signal line, a bus, or any suitable combination of signal lines and buses.

[0054] It should be understood that the system 800 may not include all of the elements shown in FIG. 8A. By way of example, the system 800 may not include a manual input unit 850. It should also be understood that the system 800 may include other components in addition to those illustrated in FIG. 8A. For example, the system 800 may include additional memory, additional processing units, a floppy disk drive or CD-ROM drive, as well as additional signal lines and/or buses. Further, although

shown as discrete components, some of the components of system 800 may comprise a single integrated element. For example, program memory 820 and database memory 830 may comprise a single, integrated memory device or circuitry.

[0055] In addition to the remote input device 870 and display device 5, a data source 10 may also be coupled with the system 800, the data source 10 being coupled with database memory 830 via communication media 15. In a further embodiment, a program source 20 is also coupled with the system 800. The program source 20 is coupled with program memory 820 by a communication media 25. Although shown as external components, any one of the display device 5, data source 10, and program source 20 may be integrated into the system 800. Furthermore, some of these external components – whether or not they are integrated into system 800 – may comprise an integrated component. For example, the data source 10 and program source 20 (if present) may comprise a single integrated data source.

[0056] The processing unit 810 may comprise any suitable processing device or combination of processing devices. For example, the processing unit 810 may comprise a processor, an ASIC (Application Specific Integrated Circuit), or any other suitable device or circuitry. The processing unit 810 may execute a set of instructions stored in program memory 820. The set of instructions, when executed on processing unit 810, cause the processing unit 810 to perform a variety of functions. For example, the processor 810 may generate a hierarchical tree structure program guide, such as any one of the hierarchical tree structure program guides 100-700. Further, the processing unit 810 may process commands received from viewers. Exemplary commands include selection of a category, selection of a content selection for viewing or recording, and zoom-in (or zoom-out).

[0057] The program memory 820 stores a set of instructions for execution on processing unit 810, as noted above. The program memory 820 may be any suitable memory device. For example, the program memory 820 may comprise a hard drive, non-volatile memory (e.g., EEPROM, ROM), volatile memory (e.g., RAM), or a combination thereof.

[0058] In another embodiment, the program memory 820 receives the instructions for execution on processing unit 810 from the program source 20. The instructions may be periodically downloaded and stored in the program memory 820.

Alternatively, the instructions may be downloaded from program source 20 upon power up of the system 800, the instructions remaining resident in program memory 820 until power down of system 800. In this embodiment, the program memory 820 may comprise volatile memory. The communication media 25 for downloading instructions from the program source 20 to program memory 820 may comprise any suitable communication media and/or method of communication. For example, the instructions may be downloaded over a telephone network link, a cable or fiber optic link, a satellite link, a microwave link, or any suitable combination thereof.

[0059] Database memory 830 may comprise any suitable memory device, including a hard drive, non-volatile memory (e.g., EEPROM, ROM), volatile memory (e.g., RAM), or a combination thereof. Database memory 830 contains data for use in generating a hierarchical tree structure program guide. Generally, at least two types of data are stored in the database memory 830: display data and program data.

[0060] Display data includes the information necessary to generate the hierarchical tree structure, including branches, levels, and categories (e.g., to generate a category box and associated text). Display data may be downloaded from the data source 10 or the display data may be downloaded onto database memory 830 from some other source and stored permanently thereon (e.g., stored in database memory 830 at the time of manufacture of system 800). Also, at least some of the display data stored in database memory 830 may be user-defined. For example, a viewer may specify – by entering the appropriate commands using remote input device 870 or manual input unit 850 – the types and/or titles of at least some of the categories existing at any level of the hierarchical tree structure. Further, a viewer may specify whether pop-up menus and/or categories are to be enabled and what information is to be included therein.

[0061] Program data may include channel information, program titles, program descriptions, and broadcast time. Program data may further include information necessary to generate pop-up categories – e.g., team statistics, schedules and rosters (see FIG. 6, reference numerals 605' and 650a-c) – and/or pop-up menus – e.g., rating, parental control identifiers, actors, director, classification, and release year (see FIG. 7, reference numerals 790' and 791-798). Such program data is commercially

available from a variety of sources. It should be understood, however, that the database memory 830 may include other types of information or data, as desired.

[0062] The database memory 830 receives data from the data source 10 via communication media 15, which may comprise a telephone network link, a cable or fiber optic link, a satellite link, a microwave link, or any suitable combination thereof. Database memory 830 may receive periodic updates of data from the data source 10. Alternatively, the data source 10 may transmit data to the system 800 in a non-periodic manner. For example, data transmission to system 800 may correspond to the availability of new data or to a data correction. In another embodiment, the system 800 may initiate a "call" to the data source 10 to request a download of data, thereby providing "on-demand" access to the most recent program data.

[0063] As set forth above, the communication media 15 coupling the database memory 830 with data source 10, as well as communication media 25 coupling program memory 820 with program source 20, may each comprise a telephone network link, a cable or fiber optic link, a satellite link, a microwave link, or any suitable combination thereof. In an alternative embodiment, however, data is obtained on a removable storage media, such as a floppy disk or a CD-ROM disk, and subsequently downloaded to the system 800. Providing data (or instructions) on a removable storage media enables a viewer to receive display data and/or program data (or instructions) through the mail by subscription.

[0064] A television viewer can input commands to the processing unit 810 using the manual input device 850 on system 800 or the remote input device 870, which is coupled with the remote receiver 840 on system 800 via a communications media 90, as noted above. The manual input device 850 includes a keypad (e.g., a plurality of push buttons) or equivalent device for command entry. The remote input device 870 may comprise a hand-held remote having a keypad or equivalent device for entry of commands. In other embodiments, the remote input device 870 comprises a joystick, a track ball, or a mouse. The communication media 90 coupling remote input device 870 with remote receiver 840 is intended to represent any suitable media and/or method of communication, such as, for example an infrared transmitter and receiver or an RF transmitter and receiver.

[0065] As previously noted, each of the manual input device 850 and remote input device 870 includes a keypad or equivalent device for input of viewer commands. Due to the hierarchical tree structure exhibited by each of the program guides 100-700, such a program guide may be navigated using no more than five keys or push-buttons. Specifically, a hierarchical tree structure program guide may be navigated using a group of keys comprising an “up” movement key and a corresponding “down” movement key, a “left” movement key and a corresponding “right” movement key, and a “select” key. These directional references refer to movements within a hierarchical tree structure program guide as the program guide is seen by a viewer on a television screen.

[0066] An exemplary embodiment of a remote input device 870 is illustrated in FIG. 8B. The remote input device 870 includes a group of keys 880 that may be used to navigate a hierarchical tree structure program guide and to choose a specific channel for viewing or to choose a specific content selection (e.g., a television program) for viewing and/or recording.

[0067] The key group 880 includes an upward movement key, or “UP” key 881, for initiating upward movements through the hierarchical tree structure of a program guide as displayed on a television, and the key group 880 includes a downward movement key, or “DOWN” key 882, for initiating downward movements through the hierarchical tree structure. Similarly, the key group 880 includes a rightward movement key, or “RIGHT” key 883, for initiating rightward movements through the hierarchical tree structure and a corresponding leftward movement key, or “LEFT” key 884, for initiating leftward movements through the hierarchical tree structure. A “SELECT” key 885 for entering selections of categories or content selections is also included in the key group 880. The manual input device 850 may include a set of keys similar to key group 880 on remote input device 870.

[0068] The remote input device 870 may include other keys (or push-buttons) in addition to the keys (881, 882, 883, 884, 885) of key group 880. For example, the remote input device 870 may include a “MENU” button 891 that, when activated (e.g., depressed), causes a hierarchical tree structure program guide (e.g., a first level of categories) to be displayed on the television or display device 5. A “RECORD” key 892 may also be provided. Remote input device 870 may also include “ZOOM+”

and "ZOOM-" keys 896a, 896b for initiating the zoom-in and zoom-out functions, respectively. Further, the remote input device 870 may include one or more "POWER" buttons 893 for turning on power to the system 800 and/or display device 5. In addition, the remote input device 870 may include "VOL+" and "VOL-" keys 894a, 894b for adjusting the volume of the system 800 and/or display device 5. Although channel tuning may be performed using a hierarchical tree structure program guide (see, for example, the program guide 500 of FIG. 5), the remote input device 870 may include "CH+" and "CH-" keys 895a, 895b for channel tuning.

[0069] The embodiments of a hierarchical tree structure program guide 100-700 and the exemplary embodiment of a system 800 for implementing such a program guide, as well as the exemplary embodiment of remote input device 870, may be better understood with reference to a method of navigating a hierarchical tree structure program guide. An exemplary embodiment of a method of navigating a hierarchical tree structure program guide is illustrated in FIGS. 9A-F. These figures illustrate only one path that a viewer may navigate through a hierarchical tree structure program guide, and it should be understood that other paths may be taken if different viewer choices are made.

[0070] Referring to FIG. 9A, a first level 905A of a hierarchical tree structure program guide 900 is shown, as the program guide 900 may appear on a television to a viewer. The hierarchical tree structure program guide 900 may be generated by system 800 and displayed on the viewer's television in response to the viewer activating the MENU key 891 on remote input device 870 (or by activating a similar key on manual input device 850). The first level 905A includes first level categories 910a, 910b, 910c interconnected by a branch 902A.

[0071] The viewer can navigate the first level categories 910a-c using, for example, the UP and DOWN keys 881, 882 on remote input device 870. As the viewer scrolls through the first level categories 910a-c, the currently selectable category (i.e., the category that may be selected by activating the SELECT key 885 on remote input device 870) may be highlighted to indicate the viewer's present location within the hierarchical tree structure of program guide 900. Alternatively, rather than highlighting the currently selectable category, the other categories may be altered to a background appearance or otherwise de-emphasized relative to the currently

selectable category. The currently selectable category may be identified for the viewer using any other suitable indicator or method of indication.

[0072] When the viewer has reached a desired category (i.e., the desired category is the currently selectable category), that category may be selected by activating the SELECT key 885 – or, alternatively, the RIGHT key 883 – on remote input device 870 (or by activating a similar key on manual input device 850). Upon selection of the desired category, that category may be permanently highlighted (or the other categories de-emphasized) and the next lower level of categories associated with the selected category displayed to the viewer. For example, referring again to FIG. 9A, the first level second category 910b is selected, exposing a plurality of second level categories 920a, 920b, 920c, 920d as shown in FIG. 9B.

[0073] Turning now to FIG. 9B, the displayed second level (905B) categories 920a-d are coupled with the first level second category 910b by a branch 902B, the branch 902B also interconnecting the second level categories 920a-d. The viewer can then scroll through the second level categories 920a-d using the UP and DOWN keys 881, 882 on remote input device 870. To move into the second level categories 920a-d, the viewer may, for example, activate the RIGHT key 883 on remote input device 870 (or a similar key on manual input device 850). Alternatively, movement into the second level categories 920a-d may be performed automatically upon selection of the upper level category. Again, the currently selectable category is highlighted relative to the other categories (or the other categories de-emphasized) at the second level. Note that if a viewer wishes to back out of the second level categories 920a-d associated with the first level second category 910b (such that a different first level category may be selected), the viewer may activate the LEFT key 884 on remote input device 870 to move back to the first level categories 910a-c, which may then be scrolled as described above, second level categories 920a-d having disappeared from view.

[0074] When moving between levels – e.g., when moving from the first level 905A to the second level 905B – the branch 902B provides a visual aid, which guides the viewer to those lower level categories and/or content selections associated with the selected upper level category. Displayed lower level categories (e.g., 920a-d) and the branch (e.g., 902B) coupling these lower level categories with their associated



upper level category (e.g., 910b) may be displayed upon selection of the associated upper level category. Alternatively, the lower level categories and branch may be displayed to a viewer as the viewer scrolls through the upper level categories. Prior to selection of a category (or content selection), lower level categories (and/or content selections) are automatically displayed for the currently selectable category during navigation and, as the currently selectable category changes, the displayed lower level categories also change.

[0075] Upon reaching the desired second level category (i.e., the desired category is the currently selectable category), the viewer activates the SELECT key 885 or RIGHT key 883, which causes the system 800 to display the third level categories (and/or content selections) associated with the selected second level category. For example, the second level second category 920b may be selected and highlighted (or other categories de-emphasized), exposing third level (905C) categories 930a, 930b, 930c coupled with the second level second category 920b by a branch 902C, as shown in FIG. 9C.

[0076] The viewer may then scroll through the displayed third level categories 930a-c. To move into the third level categories 930a-c associated with the second level second category 920b, the viewer activates the RIGHT key 883 on remote input device 870 or, alternatively, movement into the third level categories 930a-c may be performed automatically. Again, the viewer may back out of the third level categories 930a-c associated with the second level second category 920b by activating the LEFT key 884. The viewer can scroll through the displayed third level categories 930a-c (and/or content selections) using the UP and DOWN keys 881, 882 and select a third level category by activating the SELECT key 885 or RIGHT key 883, as described above.

[0077] Turning to FIG. 9D, the third level second category 930b has been selected using the SELECT key 885 or RIGHT key 883 to expose a plurality of fourth level (905D) categories 940a, 940b, 940c coupled with the third level second category 930b by a branch 902D. The fourth level categories may be scrolled using the UP and DOWN keys 881, 882 to find the desired fourth level category, which may then be selected by activating the SELECT key 885 or RIGHT key 883.

[0078] Referring now to FIG. 9E, the fourth level first category 940a has been selected, causing the system 800 to display a plurality of content selections 990a, 990b, 990c, the content selections 990a-c coupled with the fourth level first category 940a by a branch 902E. The viewer can move into the content selections 990a-c associated with the fourth level first category 940a by activating the RIGHT key 883 (or movement into the content selection 990a-c may be automatic, as noted above). Subsequently, by scrolling to the desired content selection using the UP and DOWN keys 881, 882 and activating the SELECT key 885, the viewer can select one of the content selections 990a-c. A content selection may be selected for viewing, recording, or for channel tuning, as described above.

[0079] As shown in FIG. 9E, by way of example, the second content selection 990b has been selected and highlighted. The viewer's television may then tune to the channel on which the content selection 990b is playing or will be aired or, if using the program guide 900 for channel tuning, to the channel represented by content selection 990b. In an alternative embodiment, where the viewer is selecting the content selection 990b for recording, a tag 999 may be placed in the box associated with the content selection 990b. The tag 999 indicates to the viewer that the content selection 990b has been marked for future recording, such that the viewer is informed of the record command upon subsequent accesses to program guide 900. A content selection may be selected, or tagged, for recording by, for example, activating a separate RECORD key 892 on remote input device 870 or by double-clicking the SELECT key 885. The content selection tagged for recording may be recorded onto any suitable recording media – whether in digital or analog format – including, by way of example, a magnetic tape (e.g., a VHS tape) or a hard disk drive.

[0080] In yet a further embodiment, the viewer may zoom in on the hierarchical tree structure program guide 900. As illustrated in FIG. 9E, the viewer may zoom in on the program guide 900 to display only that portion of program guide 900 within the boundary 51 (denoted by dashed line). The viewer may activate the zoom-in function by, for example, depressing the ZOOM+ key 896a on remote input device 870, and the viewer may zoom back out by activating the corresponding ZOOM- key 896b. Alternatively, the zoom-in (or zoom-out) function may be initiated and performed automatically by system 800 to maintain the text and/or feature size of

program guide 900 at a pre-defined minimum size. It should be understood that, if a large number of categories and/or content selections of a single level are to be displayed, the entire hierarchical tree structure program guide may not fit within the viewable area of a display device, irrespective of whether the zoom-in (or zoom-out) function has been engaged. In such a circumstance, only a portion of the program guide in a region surrounding the currently selectable category may be displayed.

[0081] In another embodiment, as illustrated in FIG. 9F, a pop-up menu or categories may be displayed to the viewer upon receipt of the appropriate command. For example, after selecting the second content selection 990b, the viewer may once again depress the RIGHT key 883 (or, optionally, by clicking or double clicking the SELECT key 885) to display a pop-up menu 990' coupled with the second content selection 990b by a branch 902'. The pop-up menu 990' includes additional detailed information relating to the chosen content selection 990b, such as program title, program description, actors, director, rating, parental control identifiers, classification, and year of release, as described above with respect to FIG. 7.

[0082] Embodiments of a hierarchical tree structure program guide 100-700 and a method of navigating a hierarchical tree structure program guide 900 – as well as an exemplary embodiment of a system 800 for implementing such a hierarchical tree structure program guide and a remote input device 870 for entering viewer commands – having been herein described, those of ordinary skill in the art will appreciate the numerous advantages thereof. A hierarchical tree structure program guide provides an efficient tool for navigating a large number of channels and/or a large quantity of available programming content using relatively few keystrokes and a minimum amount of scrolling. Such a hierarchical tree structure program guide may, however, be navigated using no more than five keys – making navigation simple and easy to perform, even where the user is not looking directly at the remote input device 870 – although additional keys may be used, as desired. A branch couples each category and/or content selection of a displayed level with their associated upper level category to provide a visual aid to viewers during navigation. Further, pop-up menus and/or categories may be included in a hierarchical tree structure program guide to provide viewers with additional, more detailed information regarding a television program or channel.

[0083] The foregoing detailed description and accompanying drawings are only illustrative and not restrictive. They have been provided primarily for a clear and comprehensive understanding of the present invention and no unnecessary limitations are to be understood therefrom. Numerous additions, deletions, and modifications to the embodiments described herein, as well as alternative arrangements, may be devised by those skilled in the art without departing from the spirit of the present invention and the scope of the appended claims.

## CLAIMS

What is claimed is:

1. A television program guide viewable on a display device, comprising:  
a plurality of levels including at least  
a first level displayed on the display device, the first level including a plurality of first level categories interconnected by a branch, and  
a second level including a plurality of second level categories, a portion of the plurality of second level categories associated with each of the plurality of first level categories, each said portion of the plurality of second level categories displayable on the display device in response to selection of the associated first level category, each second level category of said each portion, when displayed, coupled with the associated first level category by a branch; and  
at least one content selection associated with a category of one of the plurality of levels, the at least one content selection displayable on the display device in response to selection of the associated category, the at least one content selection, when displayed, coupled with the associated category by a branch.
2. The program guide of claim 1, wherein said each portion of the plurality of second level categories is displayable on the display device in response to the associated first level category being the currently selectable category.
3. The program guide of claim 1 wherein the at least one content selection is displayable on the display device in response to the associated category being the currently selectable category.
4. The program guide of claim 1, the at least one content selection corresponding to a channel.
5. The program guide of claim 1, the at least one content selection corresponding to a television program.
6. The program guide of claim 1, further comprising a pop-up menu associated with the at least one content selection, the pop-up menu displayable on the display device in response to selection of the at least one content selection, the pop-up menu, when displayed, coupled with the at least one content selection by a branch.

7. The program guide of claim 1, further comprising a plurality of pop-up categories associated with the at least one content selection, the plurality of pop-up categories displayable on the display device in response to selection of the at least one content selection, each of the plurality of pop-up categories, when displayed, coupled with the associated at least one content selection by a branch.

8. The program guide of claim 1, wherein the plurality of first level categories is arranged in a first substantially vertical column and said each portion of second level categories, when displayed, is arranged in a second substantially vertical column.

9. The program guide of claim 8, wherein the second substantially vertical column overlaps with the first substantially vertical column.

10. The program guide of claim 1, wherein said each portion of second level categories, when displayed, is nested underneath the associated first level category.

11. A method comprising:  
displaying a first level on a display device, the first level including a plurality of first level categories interconnected by a branch;  
displaying a plurality of lower levels on the display device, the plurality of lower levels including at least a second level having a plurality of second level categories associated with a selected one of the plurality of first level categories, each of the plurality of second level categories coupled with the selected one first level category by a branch; and  
displaying at least one content selection on the display device, the at least one content selection associated with a selected category of one of the plurality of lower levels, the at least one content selection coupled with the selected category by a branch.

12. The method of claim 11, further comprising:  
displaying the plurality of first level categories in a first substantially vertical column;  
and  
displaying the displayed plurality of second level categories in a second substantially vertical column.

13. The method of claim 12, further comprising overlapping the second substantially vertical column with the first substantially vertical column.

14. The method of claim 11, further comprising displaying a pop-up menu coupled with the at least one content selection by a branch.

15. The method of claim 11, further comprising displaying a plurality of pop-up categories, each of the plurality of pop-up categories coupled with the at least one content selection by a branch.

16. The method of claim 11, further comprising nesting the displayed plurality of second level categories underneath the selected one first level category.

17. A method comprising:  
in response to a first received command, displaying a first level on a television, the first level including a plurality of first images interconnected by a branch, each of the plurality of first images representing a first level category;  
in response to a second received command,  
identifying one of the plurality of first images as selected, the selected first image corresponding to a selected first level category, and  
displaying a second level on the television, the second level including a plurality of second images, each of the plurality of second images coupled with the selected first level category by a branch, said each second image representing one of a second level category and a content selection; and  
in response to a third received command,  
identifying one of the plurality of second images as selected,  
if the selected second image represents a selected second level category,  
displaying a third level on the television, the third level including a plurality of third images, each of the plurality of third images coupled with the selected second level category by a branch, said each third image representing one of a third level category and a content selection, and  
if the selected second image represents a content selection, performing a function.

18. The method of claim 17, further comprising:

in response to a fourth received command,  
identifying one of the plurality of third images as selected,  
if the selected third image represents a selected third level category, displaying  
a fourth level on the television, the fourth level including a plurality of  
fourth images, each of the plurality of fourth images coupled with the  
selected third level category by a branch, said each fourth image  
representing one of a fourth level category and a content selection, and  
if the selected third image represents a content selection, performing the  
function.

19. The method of claim 17, wherein the content selection corresponds to a channel and the function comprises tuning to the channel.

20. The method of claim 17, wherein the content selection corresponds to a television program airing on a specified channel and the function comprises tuning to the specified channel.

21. The method of claim 17, wherein the content selection corresponds to a television program and the function comprises tagging the television program for recording.

22. The method of claim 17, further comprising:  
arranging the plurality of first images in a first substantially vertical column; and  
arranging the plurality of second images in a second substantially vertical column.

23. The method of claim 22, further comprising overlapping the second substantially vertical column with the first substantially vertical column.

24. The method of claim 17, further comprising, in response to another received command, displaying a pop-up menu on the television, the pop-up menu coupled with one of the plurality of second images and the plurality of third images by a branch.

25. The method of claim 17, further comprising, in response to another received command, displaying a subsidiary level on the television, the subsidiary level including a plurality of subsidiary images, each of the plurality of subsidiary images coupled with one of the plurality of second images and the plurality of third images by a branch, said each subsidiary image representing a pop-up category.



26. The method of claim 17, further comprising performing a zoom-in function.
27. The method of claim 26, wherein the zoom-in function is performed in response to another received command.
28. The method of claim 26, wherein the zoom-in function is automatically performed to maintain a pre-defined minimum feature size.
29. The method of claim 26, further comprising performing a zoom-out function.
30. The method of claim 17, wherein displaying each of the plurality of first images of the first level, displaying each of the plurality of second images of the second level, and displaying each of the plurality of third images of the third level comprises displaying a shape selected from a group consisting of a rectangle, an oval, a circle, a square, a triangle, and a parallelogram.
31. The method of claim 30, further comprising placing text within the shape.
32. An apparatus for displaying a television program guide on a display device, comprising:  
a program memory to store a set of instructions; and  
a processing unit coupled with the program memory, the processing unit, when executing the set of instructions, to  
display a first level on the television, the first level including a plurality of first level categories interconnected by a branch,  
display a plurality of lower levels on the television, the plurality of lower levels including at least a second level having a plurality of second level categories associated with a selected one of the plurality of first level categories, each of the plurality of second level categories coupled with the selected one first level category by a branch, and  
display at least one content selection on the television, the at least one content selection associated with a selected category of one of the plurality of lower levels, the at least one content selection coupled with the selected category by a branch.

33. The apparatus of claim 32, further comprising a database memory coupled with the processing unit, the database memory to store data for displaying the first level and the plurality of lower levels.

34. The apparatus of claim 33, the database memory and the program memory comprising a single integrated memory.

35. The apparatus of claim 33, further comprising a data source coupled with the database memory to provide the data.

36. The apparatus of claim 32, further comprising a program source coupled with the program memory to provide the set of instructions.

37. The apparatus of claim 32, further comprising a receiver coupled with the processing unit, the receiver to receive command signals from a remote input device.

38. The apparatus of claim 32, further comprising a manual input device for input of command signals, the manual input device coupled with the processing unit.

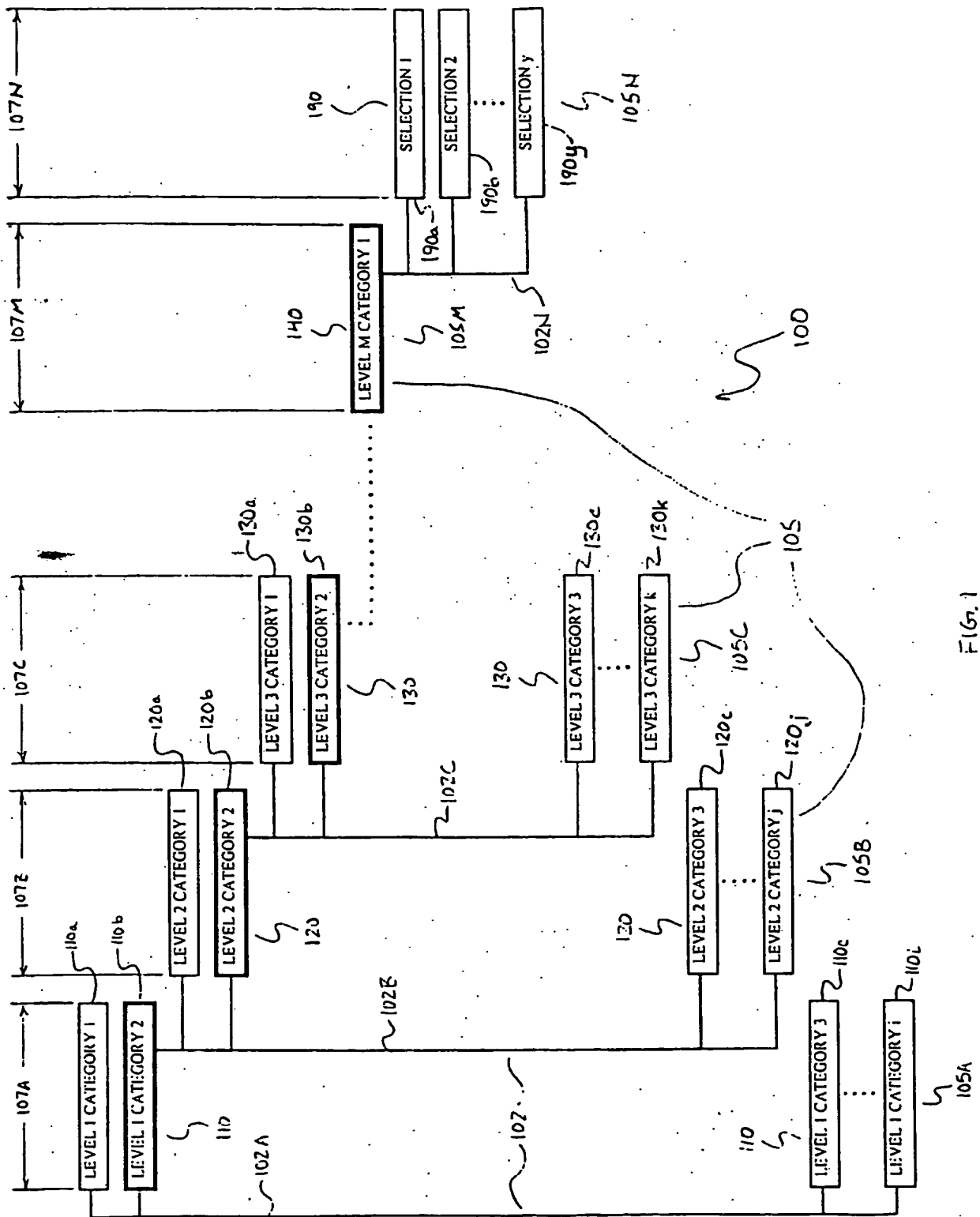


FIG. 1

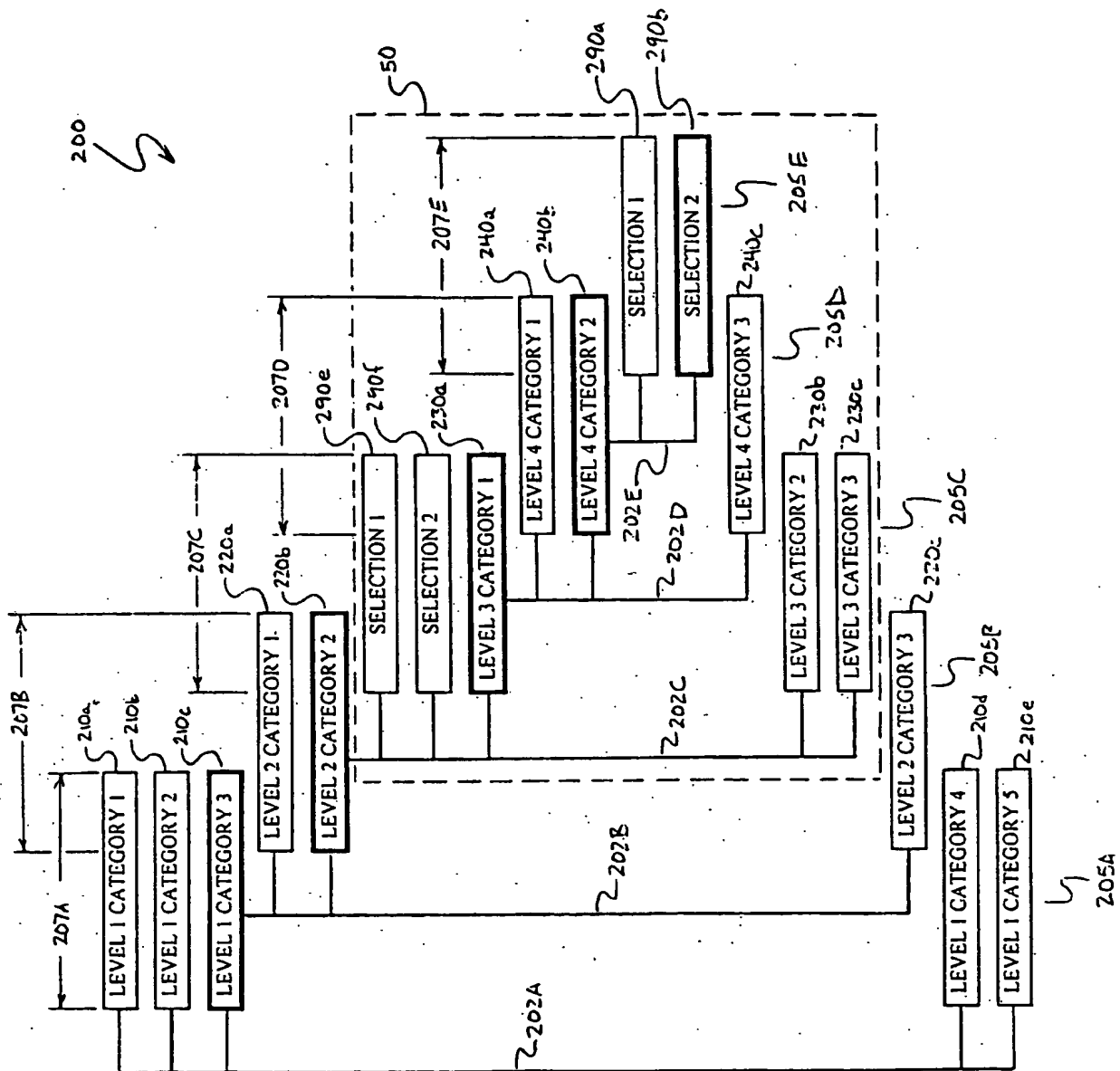


FIG. 2

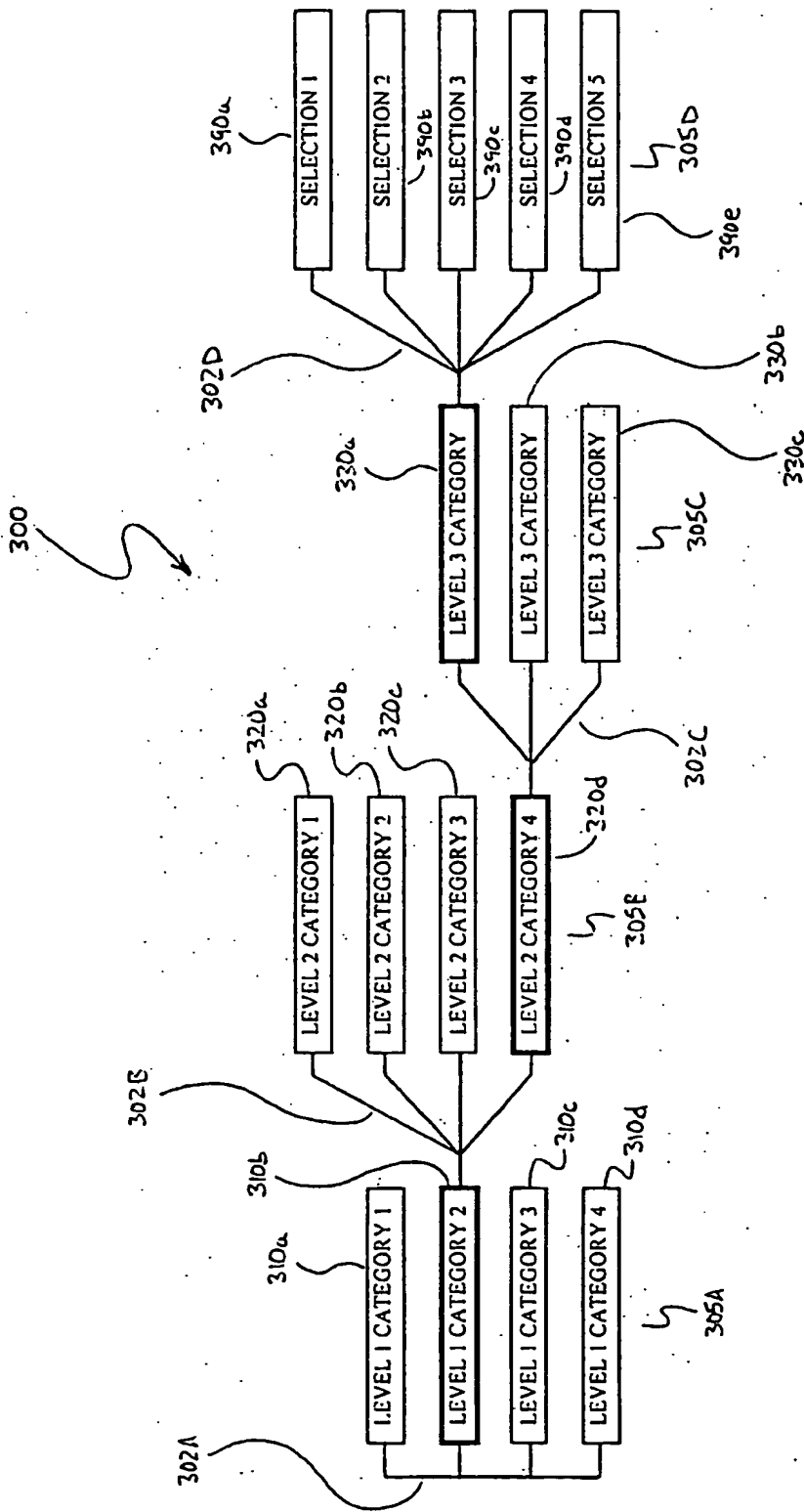
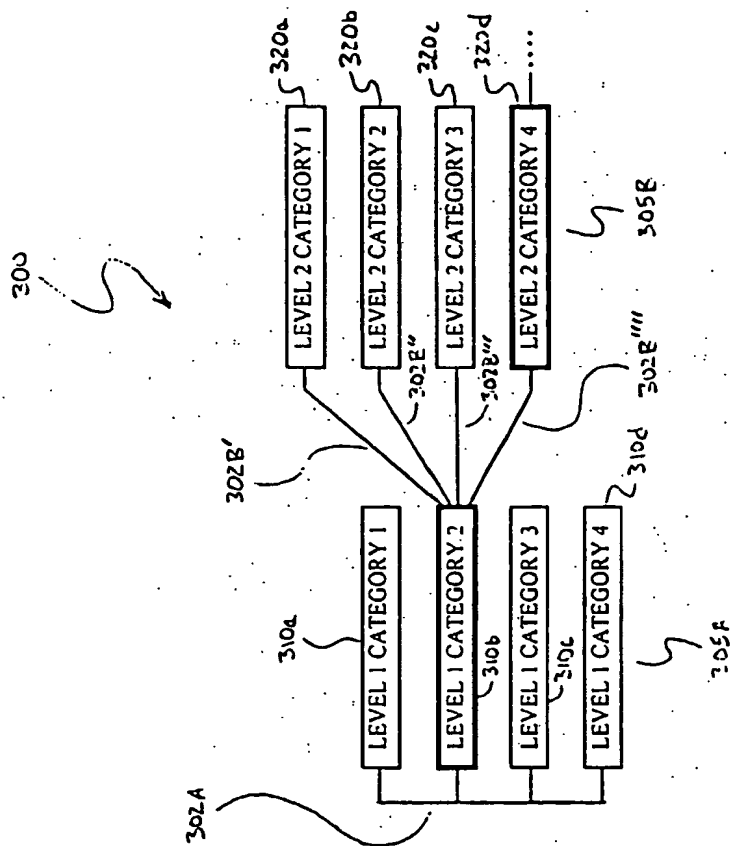


FIG. 2A



F16.2B

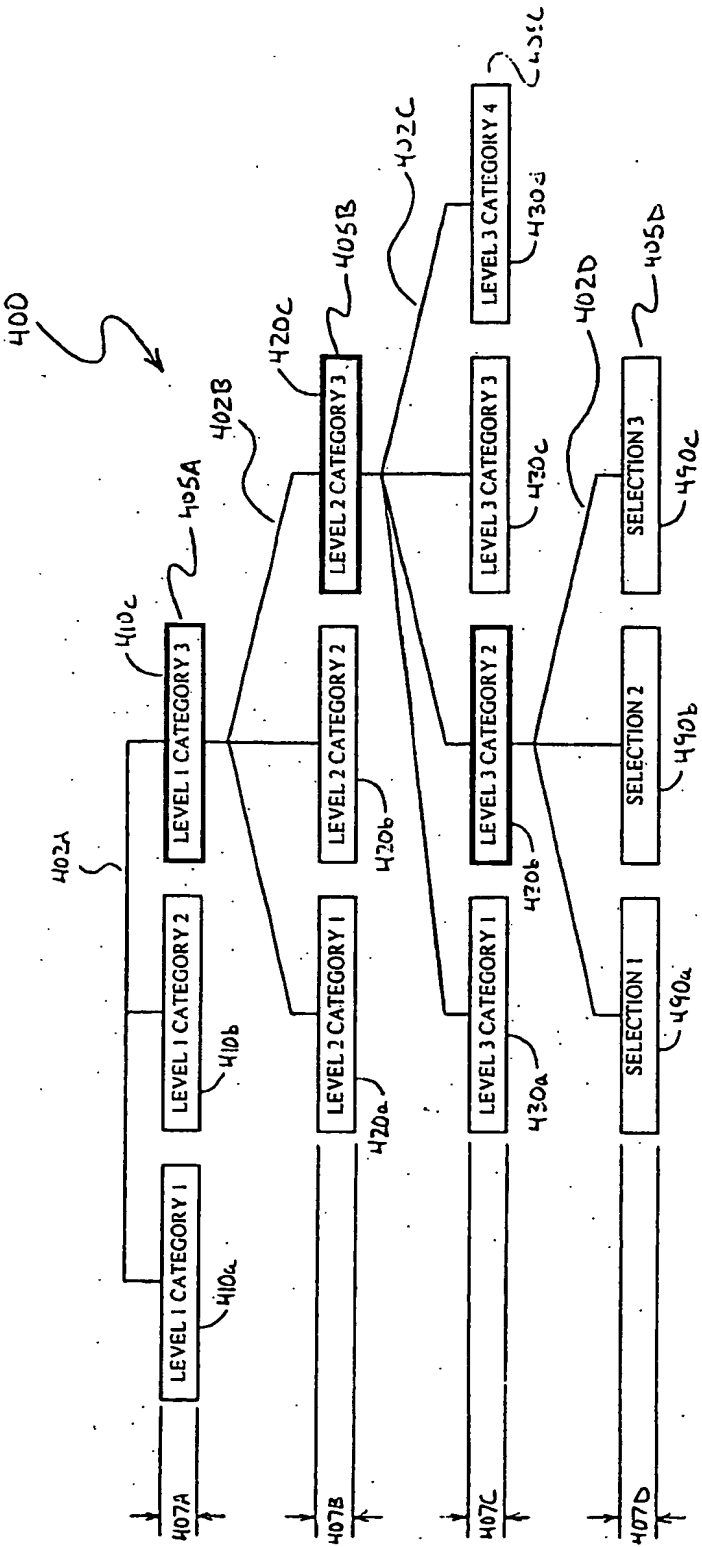


FIG. 4

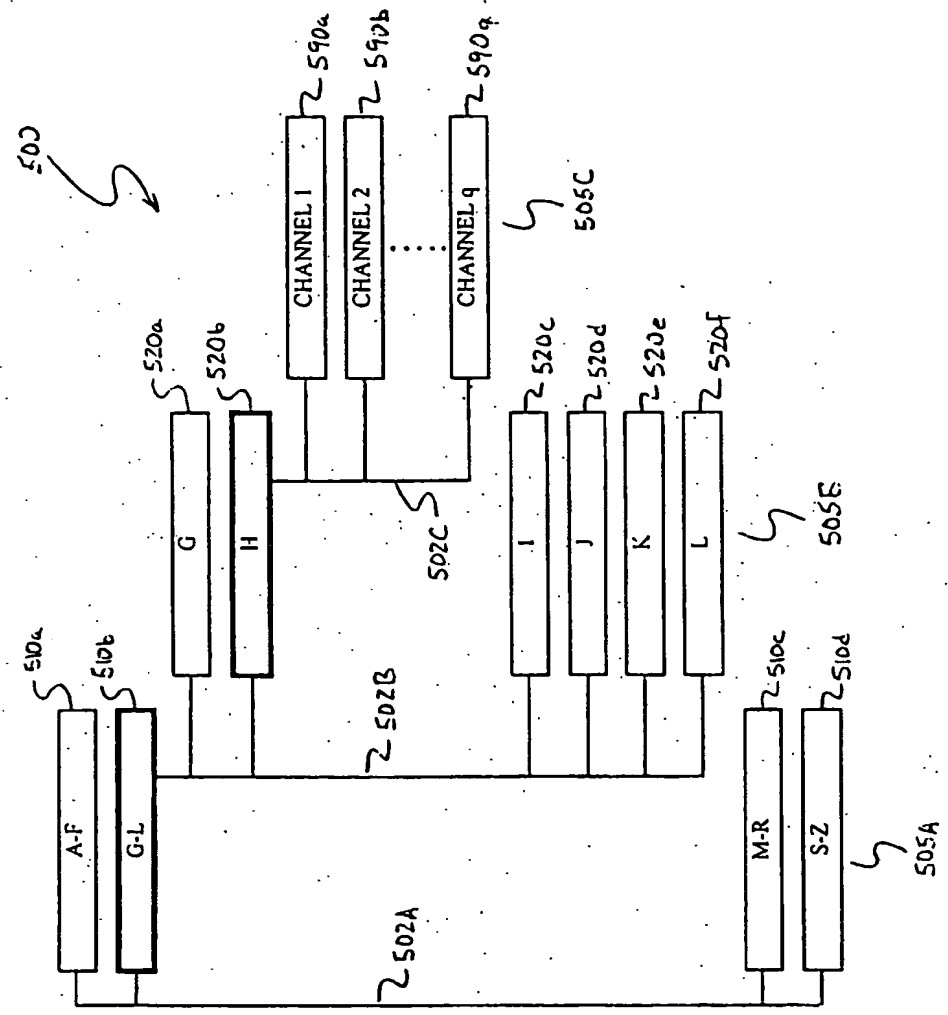
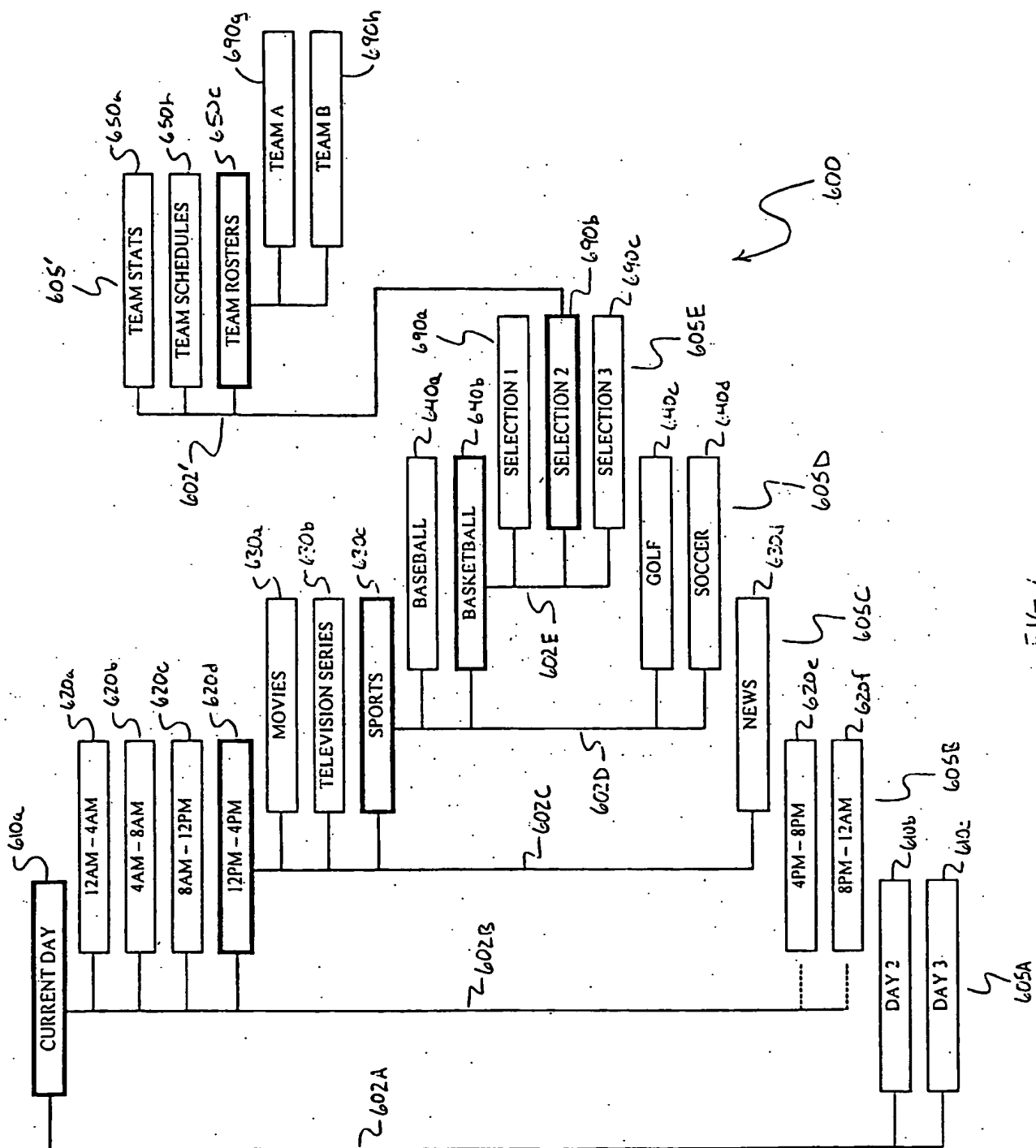


FIG. 5





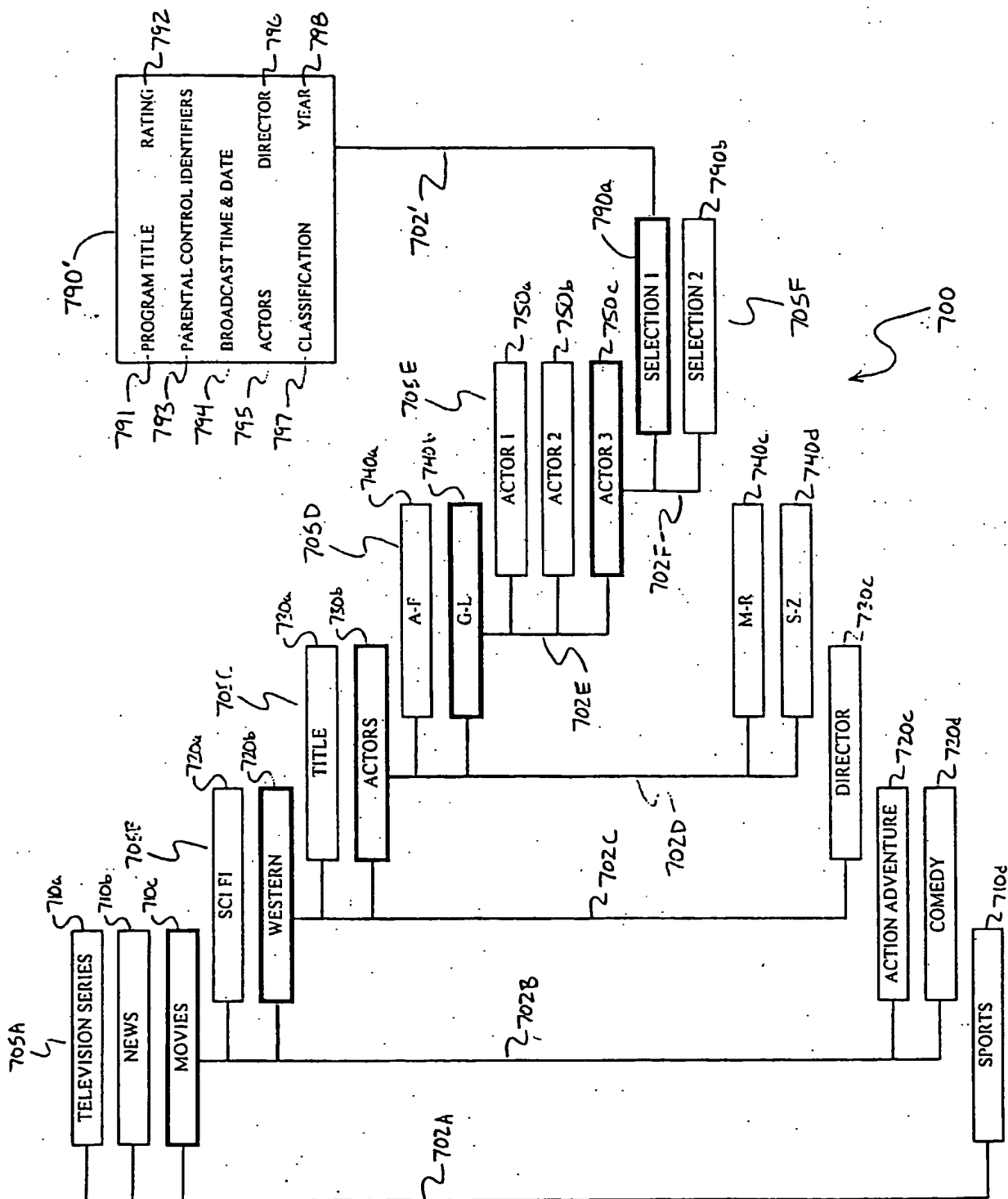


FIG. 7

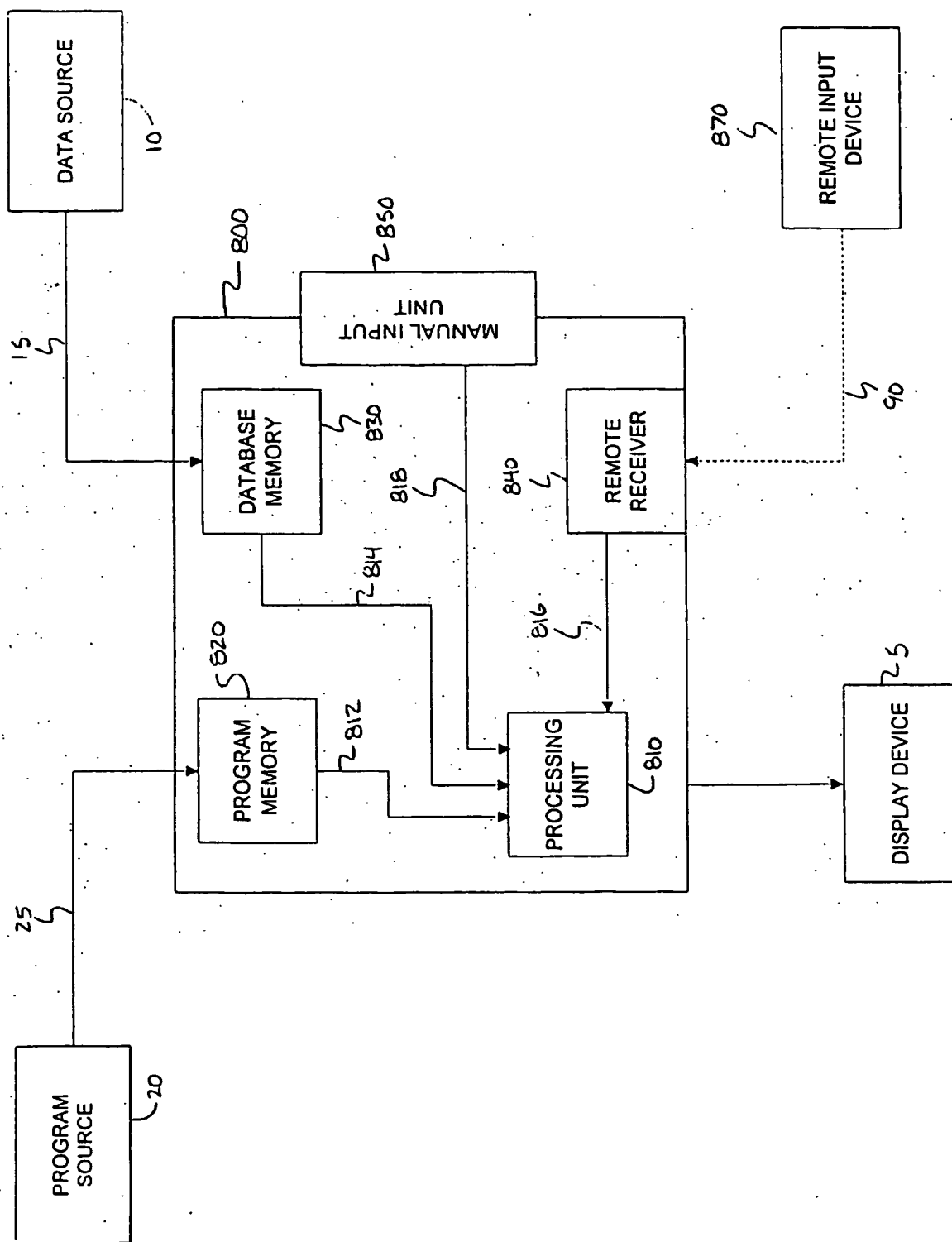


FIG. 8A

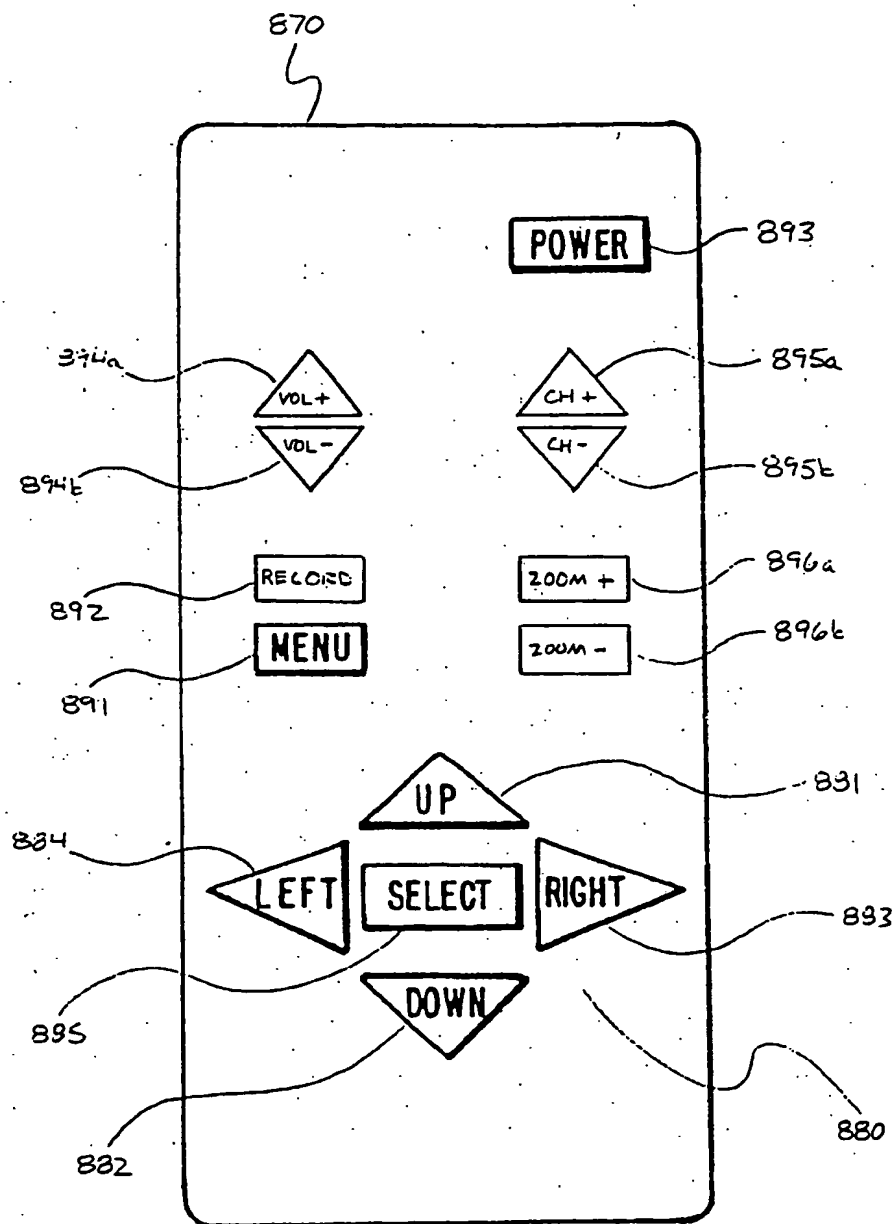


FIG. 8B

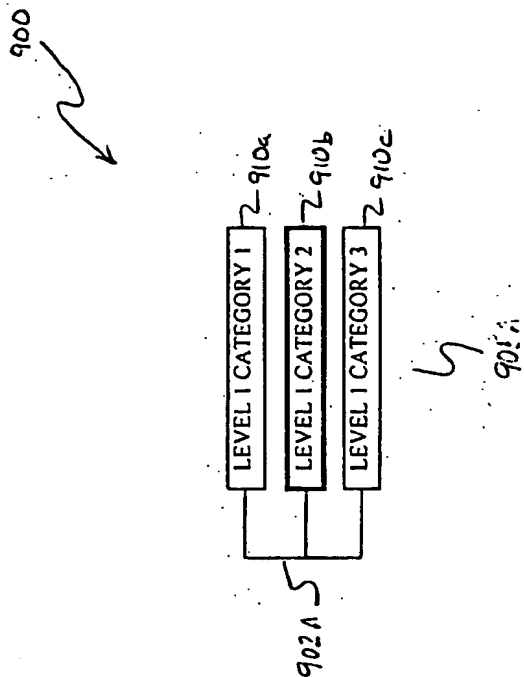


FIG. 9A

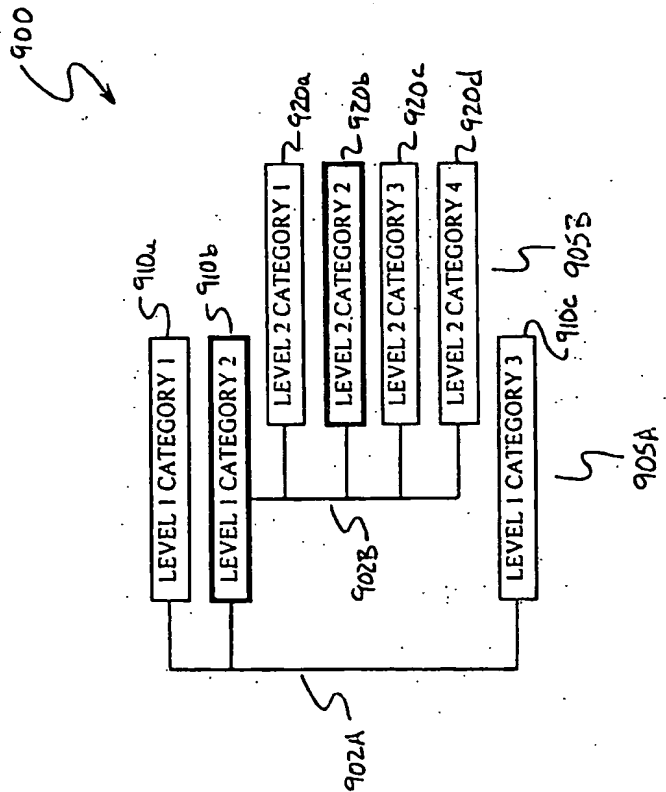


FIG. 9B

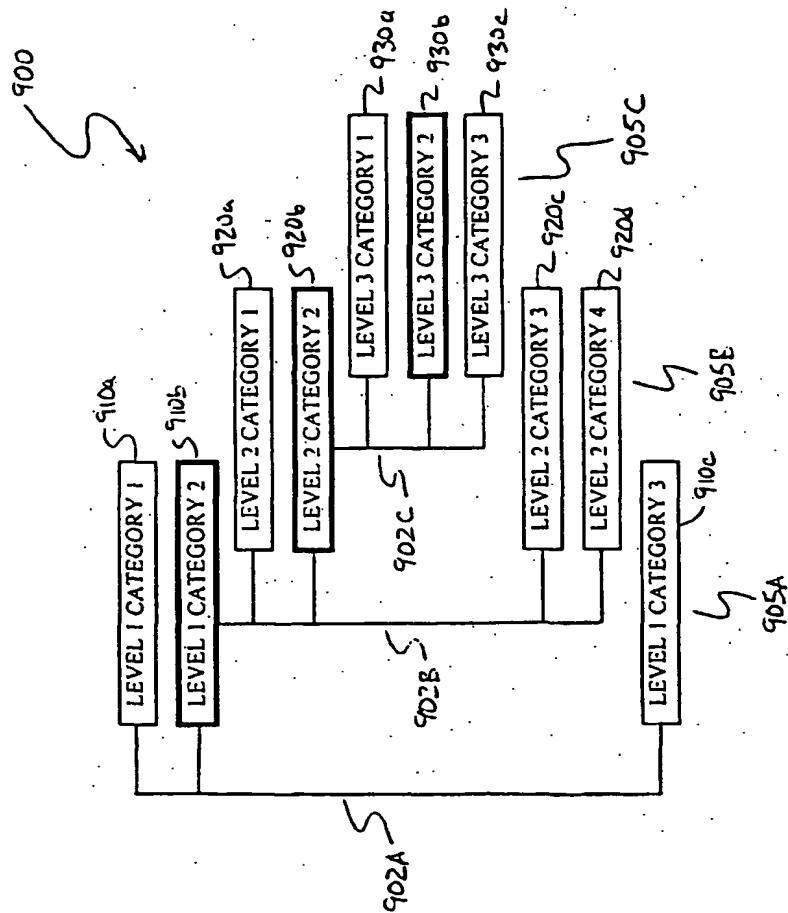


FIG. 9C

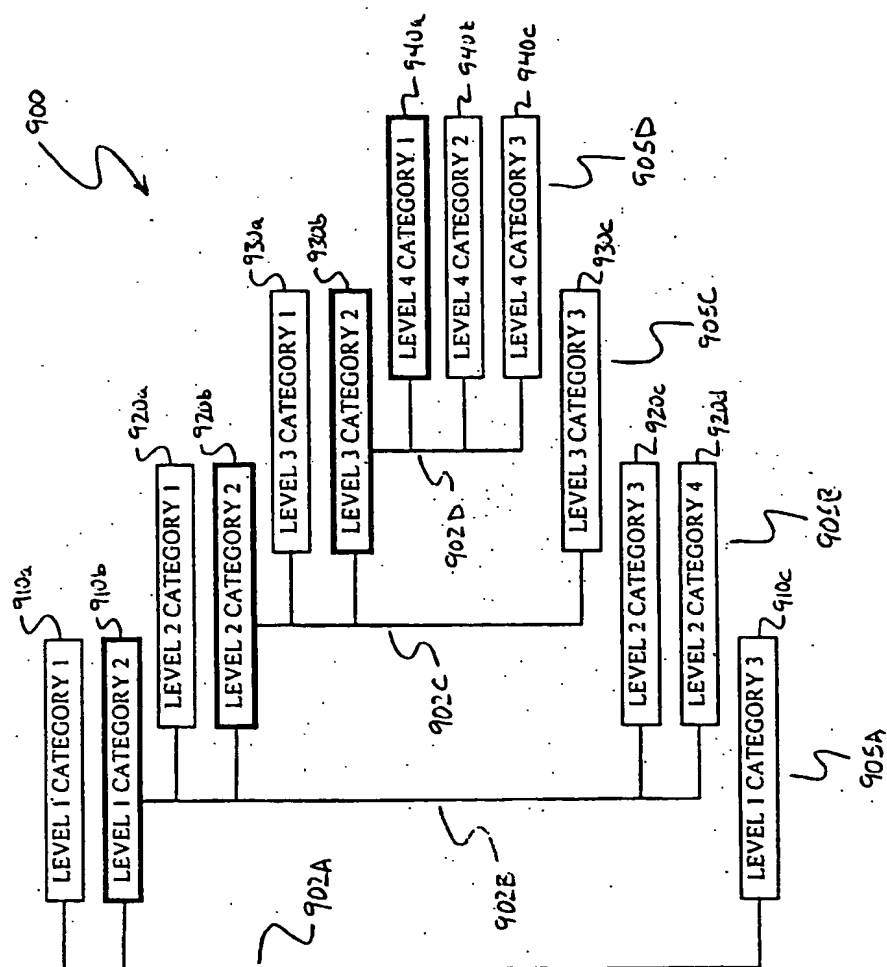


Fig. 90



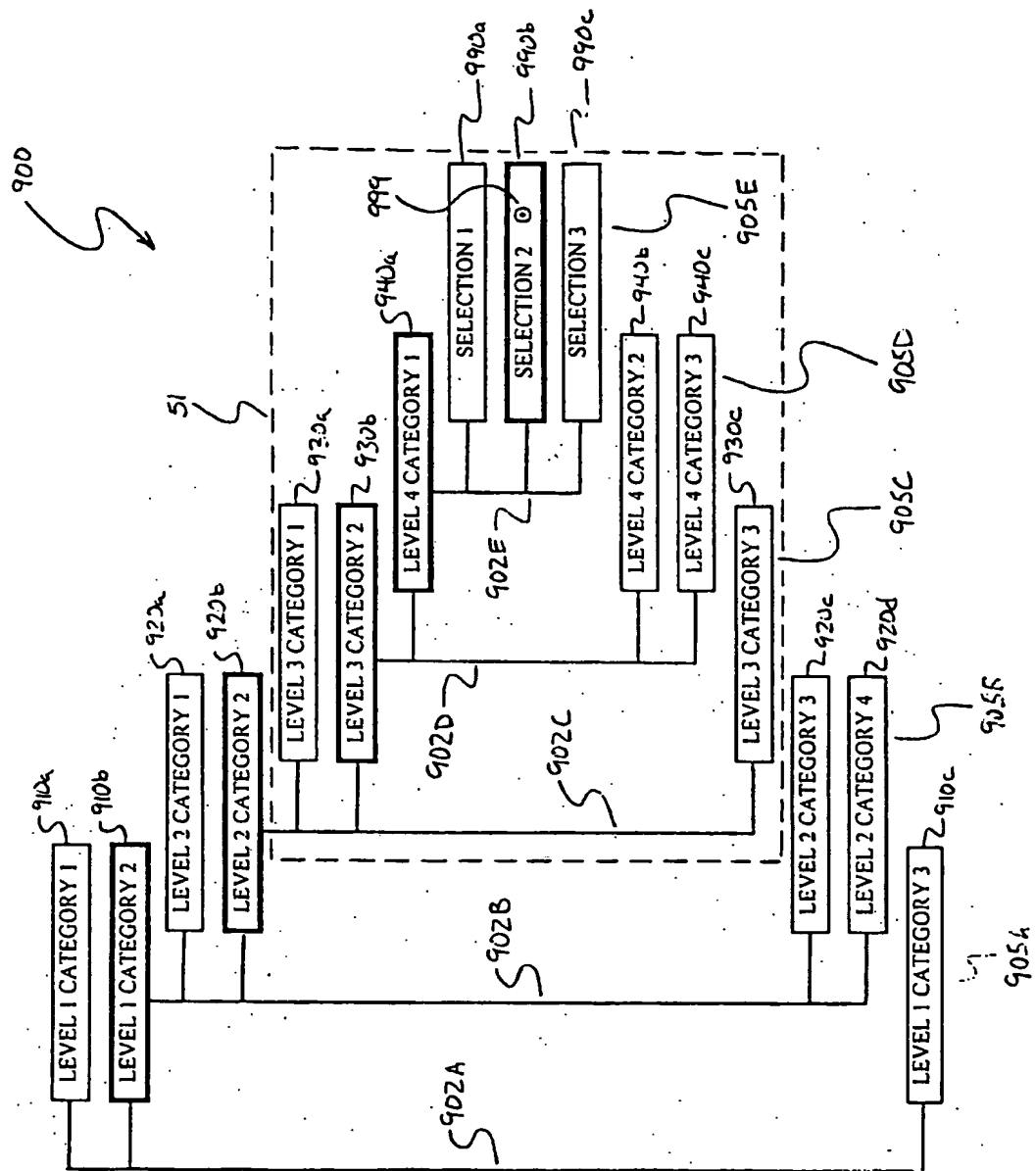


FIG. 9E

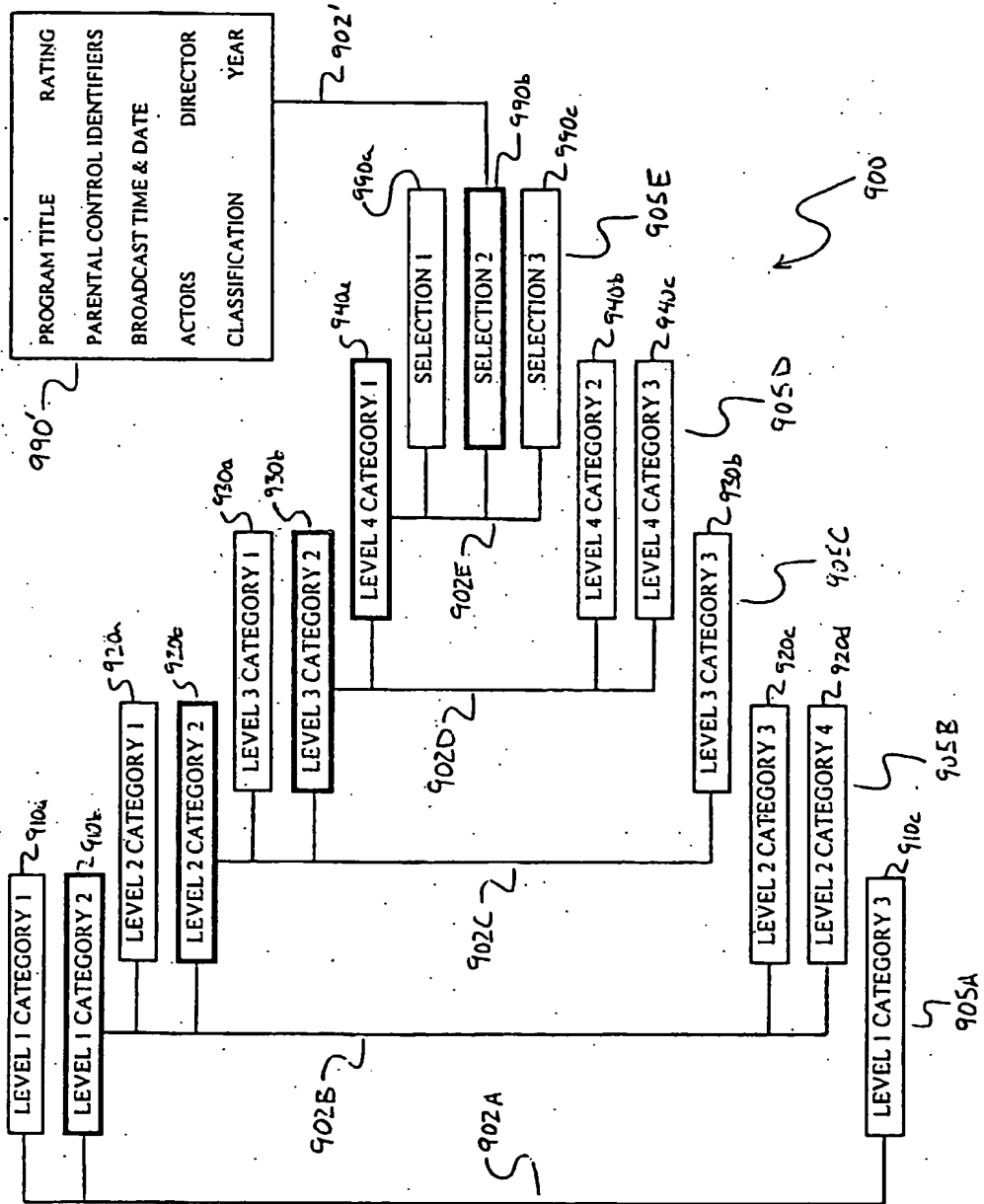


FIG. 9F

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/04039

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 3/00

US CL : 345/716, 719, 764, 810, 853, 854

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 345/716, 719, 764, 810, 853, 854

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EAST, USPAT, television program guide, EPG, tree, hierarchical structure, level, category

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,240,410 B1 (WICAL) 29 May 2001 (29.05.2001), column 2, lines 22-38, column 3, lines 41-43, column 10, lines 15-29, column 12, lines 11-28.	1-38
Y	US 6,323,911 B1 (SCHEIN et al) 27 November 2001 (27.11.2001), column 1, lines 17-20), column 2, lines 33-43, column 3, lines 45-47, column 9, lines 1-9, column 10, lines 37-40.	1-38

<input type="checkbox"/> Further documents are listed in the continuation of Box C.		<input type="checkbox"/> See patent family annex.	
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>		<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>	
<p>Date of the actual completion of the international search</p> <p>08 April 2003 (08.04.2003)</p>		<p>Date of mailing of the international search report</p> <p>21 MAY 2003</p>	
<p>Name and mailing address of the ISA/US</p> <p>Commissioner of Patents and Trademarks</p> <p>Box PCT</p> <p>Washington, D.C. 20231</p> <p>Facsimile No. (703)305-3230</p>		<p>Authorized officer</p> <p>John Cabeza / KV <i>James R. Matthews</i></p> <p>Telephone No. 703-308-3116</p>	

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